Demography India (2018) ISSN: 0970-454X
Vol. 47, Issue: 1, pp: 23-37

Research Article

Targeting Errors in Beneficiary Selection of Main Public Social Safety Nets Programmes in Bangladesh[#]

Md. Zakir Hossain[1,*], Md. Aminul Kaiser[2] & Sabina Islam[1]

Abstract

Social Safety Net Programmes (SSNPs) are recognized as the backbone of the country's poverty alleviation strategy and hence it become the integral part of anti-poverty strategy to address risk and vulnerabilities of the poor in Bangladesh. To increase the benefits that a safety net programme can achieve within a constrained budget, the government should transfer resources only to the poor and food insecure people. The capacity constraints along with other factors may hinder the perfect transfer yielding low coverage, which in turn creates targeting errors - both inclusion and exclusion. This study intends to explore the extent of targeting errors of the leading public SSNPs of Bangladesh and to find out the determinants of these errors. The study used the data of 3322 households gathered from 130 rural clusters through a research project "Targeting Effectiveness and Productive Outcomes of the Social Safety Net Programs in Rural Bangladesh: An Evaluation", sponsored by the GARE program of Ministry of Education, GoB. The study employed a number of descriptive and inferential techniques including logistic regression model to achieve the objectives.

The evaluation through programme-specific criteria indicates that the inclusion error was high for *old age allowance, allowance for the widowed women, VGD* and *RMP* beneficiaries. The highest amount of error occurred mainly due to income threshold for the allowances programmes and for female-headship for the other two programmes. In addition, the study has used five general eligibility criteria *viz., perception of interviewer, food expenditure, land ownership, PPI value* and *modified PPI value* to assess the margin of targeting errors. The estimated inclusion error was found to vary for different SSNPs for different eligibility criteria. Aggregately, the inclusion error was found 7.6% by the perception of the interviewer, 29.6% by food expenditure method, 24.4% by absolute landless criteria and 17.7% by modified PPI value criteria. The overall exclusion error estimated by food expenditure and landlessness criteria indicate that about 85% of the eligible non-beneficiary households were excluded from the targeted safety nets programmes, which indicates that a very significant number of households still left behind to receive the benefits from SSNPs in Bangladesh. The finding of logistic regression model explores that the determinants of inclusion errors vary from programme to programme. However, gender of household head, religion of the household members, household income, region of residence (division) and family type were found as common determinants. The study recommends to increase the budgetary allocation for SSNPs needs to cover all the needy households in order to reduce their vulnerability and an all-out effort is essential to eradicate the poverty to comply the concerned SDGs.

Introduction

Social safety net programmes (SSNPs) is a set of protection measures for the poor and vulnerable people suffering from different kinds of economic hardship and social deprivation. In Bangladesh, SSNPs is working as safeguard for the people suffers from various types of hardship which may occur for landlessness, crop failure, absence of earning member in the family, disability of

[1]Professor, Department of Statistics, Shahjalal University of Science & Technology, Sylhet, Bangladesh.
[2]Research Scholar, Department of Statistics, Shahjalal University of Science & Technology, Sylhet, Bangladesh.
[#]*The paper is extracted from the research report "Targeting Effectiveness and Productive Outcomes of the Social Safety Net Programs in Rural Bangladesh: An Evaluation", sponsored by the GARE program of Ministry of Education, GoB.*
*Corresponding author: Md. Zakir Hossain, Email: mzhossain.bds@gmail.com

any member, widowhood vulnerability, maternity problem, unable to work for old age, death of earning household members *etc*. The constitution of Bangladesh provided the rights of deprived people to get assistance from the government through its *article 15(D)* where it is mentioned that the state will provide necessary assistance to the people having insecurity from unemployment, old age, widowhood, loss of parents or physical and mental disabilities. The government of Bangladesh performs its duty to comply with the concerned article of the constitution through implanting SSNPs. The safety nets programmes was launched in 1972 as a short-term safeguard for the deprived people and the government efforts are continues to bring the deprived people into social mainstream in order to alleviate poverty in a broader sense. Poverty is considered as the great obstruction for the development of Bangladesh and therefore, social safety net programs become the integral part as antipoverty strategy to address risk and vulnerabilities of the poor. Bangladesh achieved a pretty success to bring down the poverty rate in recent years, 22.4% people live below the poverty line in the year 2015 (MOF-GoB, 2014-15). Though the head-count rate of poverty is decreasing during the last few decades, a very significant number of households have remained chronically poor. On this perspective, safety net programs in Bangladesh are more than a necessary element for fighting against poverty.

A number of safety net programs in Bangladesh have been implemented targeting different groups of population. It is documented that safety nets contribute to the development policies in four ways, *viz.*, redistribute income to the poorest and most vulnerable, can enable households to make better investments, help households to manage risk, and permit governments to make choices regarding efficiency and growth. The study also characterized the nature of a good safety net such as appropriateness, adequacy, equability, cost-effectiveness, incentive compatibility, sustainability, and dynamism (World Bank, 2008). Evidence suggests that social safety net programs played a vital role in combating with the poverty situation for the developing countries like Bangladesh. However, the total allocated amount for SSNPs is about 2.2% of GDP during the last few years.

The review of literature reveals that a number of studies have been conducted on social safety net programmes concentrating on goals, challenges, leakages, potential outcomes and successiveness (Akter, 2014; Ahmed, 2007; Ahmed *et al*., 2009; Ahmed *et al*., 2014; Ali, 2005; Barkat *et al.*, 2013; Choudhary, 2013; Coady, 2004; Ismat Ara, 2013; Khan, 2013; Nasreen *et al*., 2006; Rahman *et al*., 2011; Rahman and Choudhury, 2012; Anser Uddin, 2013; Zohir *et al*., 2010). With the initiative of UNDP, the Power and Participation Research Centre (PPRC) has executed a project to provide the Government of the Bangladesh with the tools to undertake essential reforms for making new policy framework and portfolio of social safety net programmes (Rahman *et al.*, 2011; Rahman and Choudhury, 2012). The first volume of the research report consists of a review of the international policy experience, describing the pertinent international lessons to be applied, prepare an analytical inventory of current provision and providing an authoritative account of the existing set of social safety net programmes (Rahman *et al.*, 2011). The second volume of the PPRC research report dealt with an empirical evaluation of the ten major social safety nets programmes currently being executed in Bangladesh by the Government of the Bangladesh as well as NGOs (Rahman and Choudhury, 2012).

Some studies reviewed the existing set-up of social safety net programmes and their importance for protecting the poor suffers from various kinds of hardships (Khuda, 2011; World Bank, 2006; 2008). In a book published by the World Bank, Grosh *et al*. (2008) reviewed the design and implementation of safety nets administered in different parts of the world and made suggestions regarding effective safety nets programs. In a study, Khuda (2011) reviewed the existing social safety nets in Bangladesh and concluded that the SSNPs in Bangladesh have led to increased school enrolment and attendance especially among girls in secondary schools and closing the gender gap; additional employment generation; provision of food during crisis; building infrastructure; and increased access to and utilization of maternal health care services. The study has also made suggestions regarding effectiveness of SSNPs in Bangladesh in terms of sustaining high-level political commitment, strengthening programme management, better targeting of beneficiaries, minimizing leakages, improving financial management and payment systems, and strengthening monitoring and supervision. On the other hand, Khan (2013) studied the political motives of social safety nets in

Bangladesh and explored that many SSNPs have been designed with political objectives, including generating support for ruling class. The study also reported that there are 98 specifically designed social safety net programs directly operated by the government of Bangladesh and most of the programmes have limited coverage due to inadequately funded. The study also documented that the 10 top programmes, accounting for 80.5% of total SSNP allocations in the financial year 2010-11. The study also argues that poor become subject to political capture and many of the inhabitants try to get public funds through political patronage. In a study, Zohir *et al* (2010) investigated the effects the food price surge of 2007-08 on the poor and vulnerable in both rural and urban areas of Bangladesh and has made suggestions regarding the ways of strengthening social protection/safety net system in Bangladesh for mitigating the risks of food crisis and improving food security of the poor. It is documented that social safety net programmes played vital role in Bangladesh to protect the poor households from poverty and vulnerability (Ahmed *et al*., 2014). However, the study has given emphasis on better targeting of beneficiaries and better monitoring and supervision system to attain the goal of poverty reduction.

With respect to the leakages of the social safety nets programmes, a few studies estimate significant level leakages for VGD, VGF, PESP and FFE programs, and 26% leakage was found for FFW program (World Bank; 2003, Ahmed, 2004). Besides, it is reported that a considerable part of the budgetary allocations for female secondary stipend program (about 20-40 percent) do not reach the beneficiaries and are perhaps misappropriated by the school authorities and other intermediaries (GoB, 2003); while other studies show 16-20 percent leakage for the FFE program though the leakage shows decreasing trend from VGF program in the aftermath of the 1996 floods (Dorosh *et al.,* 2004). Tietjens (2003) estimates 10-12 percent leakage in the female stipend programs. Assessing social safety nets in Bangladesh, the World Bank (2006) has proposed new strategies to minimize poverty and vulnerability and proposes how to improve allocation of fiscal resources. With the support of FAO-NFPCSP, Barkat *et al.* (2013) made a comprehensive review of targeting mechanism and errors of 15 major pubic SSNPs under three broad categories - conditional, unconditional, and education stipends programmes. The study estimated that one in every four households received benefit from at least one public social safety net programme by analyzing the HIES-2010 data set. The study made a number of recommendations including revising the targeting criteria, increasing the ethical and political commitment, coordination by a single authority, creating a database of extreme for easy and error-free selection of beneficiaries, and conducting regular survey/research on coverage, targeting and impact of SSNPs.

The problems, gaps, discrepancies regarding the application of social safety net programs are yet to be concretely determined since this subject matters are under-researched. Specifically, the existing studies failed to explore the targeting errors explicitly using both programme-specific and general criteria, may be due to lack of national level data. Moreover, sample size limitations was also identified as a major hindrance for most of the studies to make inference on targeting mechanism. Besides, the identification of determinants of the targeting error was completely absent in the existing studies. Hence the study aims to explore the margin of targeting error for major public safety nets programmes executed in rural Bangladesh and to identify the determinants of the inclusion error.

Data and Methods

The study used the primary dataset collected through a research project "Targeting Effectiveness and Productive Outcomes of the Social Safety Net Programs in Rural Bangladesh: An Evaluation", sponsored by the Ministry of Education, GoB under the canopy of Grants for Advanced Research in Education (GARE). The study covered the information of 14 SSNPs (including the top10 budgeted programs) implementing in the rural areas of Bangladesh considering the budget allocation and number of beneficiaries at national level as well as their aims regarding protection and promotion issues. The units of analysis for the study include the households received benefits from selected safety nets programmes as well as the households eligible and potential to receive support from any SSNPs but excluded from the programme for some reasons. Both village mapping through PRA and

proxy means tests[2] were used to identify the targeted units of analysis. The study has adopted mainly cluster sampling technique, in which the primary sampling units (PSUs) defined by the Bangladesh Bureau of Statistics (BBS) are considered as clusters. Following the recognized sample size determination formula[3] [on the basis of 31% indicator percentage[4] (proportion (SSNP beneficiary and/or eligible non-beneficiaries) are required in each domain of households below poverty line), 95% confidence interval, 0.13×p relative precision and highest response distribution with an assumed design effect 1.5], the study collected information from 3322 households covering at least 30 clusters from each of the four domains (old divisions) (Hossain and Ahmed, 2017). Among the surveyed households, about 62% were found as current beneficiary, about 8% old beneficiary and about 30% eligible non- beneficiary. The study used several statistical tools and techniques including logistic regression analysis to achieve the research objectives.

Results and Discussions

Though each of the social safety net programmes has their own definite criteria for beneficiary selection, however most of the programmes are designed for the poor people. Therefore, targeting the poorest households will indicate better performance for any programme and inclusion of the non-poor households will indicate worse performance. A rapid review on the targeting criteria of the existing social safety net programmes reveals that 'poverty/extreme poverty/poor household' is an essential criterion for all the programmes along with other conditions such as low income, landlessness, disability, gender, old age, maternity and other vulnerability *etc*. The criteria are apparently accurate and they are set to serve the purposes. Now, if a programme violates its inclusion or exclusion criteria while selecting beneficiaries, conclusion could be drawn that targeting error has occurred. Therefore it is essential to estimate both inclusion and exclusion error based on the predetermined targeting criteria of the SSNPs.

Errors in the selection of beneficiaries of the safety net programs

It is recognized that there are two types of errors in the selection of beneficiaries of the social safety net programs executed in Bangladesh: Inclusion error (not eligible for a specific safety nets programme but received benefits from the programme) and Exclusion error (eligible for a specific safety nets programme but do not received benefits from the programme). The inclusion error, in turn, reduces the resources available to support the poorest and most food insecure households in the lowest two quintiles. While the exclusion error, in turn, forced eligible people to be out of getting benefits from government support to reduce their vulnerability. Both the inclusion and exclusion error have been estimated using some general criteria as well as specific criteria of the selected programmes. For this purpose, the beneficiary selection criteria set in the implementation documents of the respective SSNPs have been used as indicators. Based on the common specific criteria for the selected safety nets programmes, the general criteria for the study is established and the study used the following general criteria in addition to the programme-specific criteria:

(i) Perception of the interviewer during collection of household-level data (whether the household is eligible to get SSNP benefit according the criteria of the programme)

(ii) Food expenditure (whether the food expenditure is greater to food poverty line expenditure) as a proxy of poverty,

(iii) Ownership of land (whether the landholding of the household including homestead is greater to 15 decimals) as a proxy of absolute landlessness though it is recognized that households owning land 50 decimals or less are functionally landless,

---

[2] Proxy mean tests: A targeting method by which a score for applicant households is generated based on easy-to-observed household characteristics, such as the location and quality of the household's dwelling, landholdings, ownership of durable goods, demographic structure, education, and so on.

[3] $n = \frac{p(1-p)Z^2}{(0.13p)^2} \times Deff$ where p is the indicator percentage, Z is the value of normal variate with 95% confidence interval, $0.13p$ is the relative error margin and *Deff* is the design effect.

[4] HIES 2010 reported that about 31% households lies below poverty line.

(iv) PPI value and Modified PPI value (without considering the points related to Indicator-1 of *Quick Poverty Scorecard* and allowing for the cut-off point 35)

(v) Perception-based food security condition of the households (household members cannot manage 3-square meals easily throughout the year) used to measure exclusion only

(vi) Perception-based self-assessed social status of the households (households are ultra-poor or poor) used to measure exclusion only

The food poverty line expenditure for the year 2015 has been estimated using the food expenditure found HIES-2010 and GDP deflator of several successive years. The projected amount of per capita food poverty line expenditure in the year 2015 stands Tk.1343/month after adjusting by the GDP deflator for the years 2011 to 2015 based on the food poverty line expenditure of HIES 2010 (Tk.959.50). The value of PPI has been revised based on the field experience as well as discussed with several experts. It is to be mentioned that the points of indicator-1 (related to the household members aged 0-11 years) ranged from 0 to 27 (for none=27) overestimate the true scenario of poverty score. Hence, it is decided to exclude this indicator for estimating poverty score using the quick poverty scorecard and this method is named here modified PPI value.

Inclusion error considering programme-specific eligibility criteria

The inclusion error of the currently beneficiary households for the selected safety nets programmes according to the programme-specific eligibility criteria is shown in Table 1. The inclusion error was found 56.3% for income threshold (less than Taka 10,000) and 26.8% for landlessness criteria in case of the *old age allowance*. Surprisingly, the inclusion error was found 16.1% for minimum age criteria of *old age allowance*.

Table 1: Targeting errors in certain SSNPs using programme specific eligibility criteria

	Programmes and Specific Criteria	Estimated Error (%)
1.	***Old age allowance:***	
	Minimum age criteria (male 65 years, female 62 years)	16.1
	Annual Income of beneficiary (less than Taka 10,000)	56.3
	Beneficiary is from a landless household	26.8
	Beneficiary of other Public/NGO SSNP	25.5
2.	***Allowance for the Widowed Deserted and Destitute***	
	Annual Income of beneficiary (less than Taka 12,000)	36.7
	Female is a Widow/Deserted by Husband/Destitute	1.6
	Beneficiary is from a landless household	3.7
	Beneficiary of other Public/NGO SSNP	18.3
	Minimum age is greater than 18 years	11.2
3.	***Allowances for Financially Insolvent Disables***	
	Annual Income less than 36000 Taka	8.7
4.	***General Relief Activities***	
	Household Affected by Natural Disaster	94.1
	Beneficiary of other Public/NGO SSNP	20.6
	Landless/Less than 50 decimal of land	2.9
5.	***VGD programme***	
	Landless/Having Less than .15 acres of land	14.7
	Female Household head and age (18-49) years	85.3
	Monthly HH income less than 300 Taka	37.3
	Beneficiary of other Public/NGO SSNP	40.9
6.	***Test Relief***	
	Household Affected by Natural Disaster	40.8
	Landless/Have Less than 50 decimal of land	2.8
7.	***Primary Education Stipend Project***	
	Poor Family (Food Poverty Line Income)	36.1

	Landless/Owning less than .50 acres	13.0
8.	***EGPP***	
	Monthly Income less than 4000 Taka	2.7
	Beneficiary of other Public/NGO SSNP	35.1
	Landless/Having Less than 0.5 acres of land except Homestead	0.00
9.	***RMP***	
	Female Headed Household	70.0
	Female Headed Household and Age (18-35) years	83.3
10.	***REOPA***	
	Land < 0.5 acres	5.0
	Household Affected by Natural Disaster	51.7
	Beneficiary of other Public/NGO SSNP	33.3
Note: 1. Income is calculated per capita 2. Land is calculated without homestead land and .5 acres consider as a landless households.		

The inclusion error for *allowance for the widowed, deserted and destitute women* is estimated at 36.7% for income threshold (less than Taka 12,000) and 11.2% for minimum age criteria (Table 1). No notable error was found in beneficiary selection for the *allowances for financially insolvent disables.* The inclusion error was found highest (85.3%) due to female-headed household criteria for VGD beneficiary selection (Table 1). About 37% inclusion error was found due to monthly income criteria among the VGD beneficiaries. Similar kind of error has been found for the beneficiary of *rural maintenance programme*: 70% households were found headed by male rather than female. Though the inclusion error for safety nets programmes related to relief activities was found very notable for the criteria 'household affected by natural disaster' (94.1% for GR, 40.8% for TR, and 51.7% for REOPA), however it is observed that the allocation and number of beneficiary was reduced over time for these programmes. Therefore the error due to this criteria (households affected by natural disaster) could not be considered as a noteworthy one.

Inclusion error considering general eligibility criteria

The study adopted several general eligibility criteria, *viz.*, *perception of interviewer*, *food expenditure*, *land ownership*, *PPI value* and *modified PPI value* to estimate the inclusion error in addition to the programme-specific eligibility criteria. Table 2 shows the percentage of inclusion error by several general eligibility criteria for each of the selected safety nets programmes. The findings indicate that the inclusion error (concerning beneficiary selection) for the *old age allowance* is estimated at 13.4% by perception method, 32.1% by food expenditure method, 25.1% by absolute landlessness criteria, 85.2% by PPI value criteria and 19.5% by modified PPI value criteria methods. The severity of inclusion error was found lower for *allowance for the widowed, deserted and destitute women* for all the general criteria in comparison to the *old age allowances*. The inclusion error for *allowances for financially insolvent disables* was found 5.8% by perception method, 28.3% by food expenditure method, 25.4% by landlessness criteria, 79.8% by PPI value criteria and 42.8% by modified PPI value criteria methods. The inclusion error for the allowances for insolvent freedom fighters is not so important for policy implications because the inclusion criteria has been changed recently. Now only the criteria is the certified freedom fighter, approved by the concerned Ministry through its legal procedure. Among the currently beneficiary sample households, the inclusion error for *vulnerable group development programme* is estimated at 7.9% by perception method, 26.2% by food expenditure method, 22.2% by absolute landlessness criteria, 75.8% by PPI value criteria and 13.5% by modified PPI value criteria methods. The inclusion error for *relief programmes* (*gratuitous* and *test relief*) is not found remarkable by perception and modified PPI value methods. The inclusion error is estimated at 11.3% and 14.7% by food expenditure method for *test relief* and *gratuitous relief programmes* respectively.

The inclusion error was not found very much for the selected programmes (*100-Days Employment Guarantee Scheme*, *Rural Employment and Road Maintenance Program*, and *Rural Employment Opportunities for Public Assets* including *Food for Work* and *Cash for Work*) related to

Public Works/ Employment Generation. According to the perception of the interviewer, no inclusion error occurred for *Road Maintenance Program* and *100-Days Employment Guarantee Scheme* programmes. According to their perception, only 3.3% error reported for REOPA *programme* that includes *Food for Work* and *Cash for Work.* However, the inclusion error is estimated at 10.8%, 30% and 25% for *100-Days Employment Guarantee Scheme*, *RMP* and *REOPA (Food for Work* and *Cash for Work) programmes* respectively by food expenditure method. The inclusion error for *100-Days Employment Guarantee Scheme*, *RMP* and *REOPA (Food for Work* and *Cash for Work) programmes* is not found notable according to landlessness (absolute landless) criteria.

The inclusion error for *Primary Education Stipend Programme* (PESP) and *Secondary Education Stipend Programme* (SESP) could not be accurately estimated due to lack of some information related to school attendance and percentage of obtained marks. However, the estimated error by some general criteria might give a rough idea about targeting error. The inclusion error is estimated at 5.9% and 5.3% by for *Primary Education Stipend Programme* and *Secondary Education Stipend Programme* respectively by perception method. The inclusion error is found higher for *Primary Education Stipend Programme* by both food expenditure method (39.6%) and landlessness criteria (68.3%). On the other hand, the inclusion error is estimated at 38.5% and 35.8% by food expenditure method and landlessness criteria for *Secondary Education Stipend Programme*. The targeting error in beneficiary selection was found reasonably lower for almost all of the selected programmes in comparison to that of estimated by Barkat *et al*. in their study using poverty method (Barkat *et al*., 2013). Accumulating the currently beneficiary households for all the programmes, the inclusion error is found 7.6% by the perception of the interviewer, 29.6% by poverty line food expenditure, 24.4% by absolute landless criteria and 17.7% by modified PPI value criteria. It is to be noted that the inclusion error is found 79.5% by PPI value criteria using the cut-off point 35 as PPI value. The study findings recommends to revised the cut-off point of PPI value or adopt the **modified PPI value method** after a thorough investigation using a large sample data. Therefore, the policy makers should give emphasis on inclusion error found by perception of the interviewer, food expenditure method and landlessness criteria.

Table 2: Inclusion error considering some general criteria of SSNP benefits

Name of the programme	Total Beneficiary HHs	% of inclusion error by different general criteria				
		Perception of interviewer	Food expenditure	Land	PPI Value	Modified PPI Value
Old Age Allowance	620	13.4	32.1	25.2	85.2	19.5
Allowances for the Widowed/ Deserted/ Destitute Women	327	6.1	17.1	15.3	85.9	12.5
Allowance for financially insolvent disabled	173	5.8	28.3	25.4	79.8	42.8
Vulnerable Group Development	252	7.9	26.2	22.2	75.8	13.5
Test Relief	71	4.2	11.3	5.6	40.7	1.4
Gratuitous Relief	34	0.0	14.7	11.8	67.6	2.9
100days ES/EG programme for Hardcore poor	37	0.0	10.8	5.4	62.2	0.0
RMP	30	0.0	30.0	3.3	63.3	3.3
REOPA	60	3.3	25.0	15.0	81.7	5.0
Primary Education Stipend Project	391	5.9	39.6	68.3	68.0	23.0
Secondary Education Stipend Programme	187	5.3	38.5	35.8	83.4	16.0
Total	2045	7.6	29.6	24.4	79.5	17.7

The discussion on the estimated amount of inclusion error by programme-specific criteria and some general criteria indicates that there are still a moderate margin of targeting error exists in beneficiary selection. Moreover, the error in beneficiary selection was found to vary by different criteria. Therefore, some plausible explanation demands here to have a clear-cut understanding of the inclusion error of the major public safety nets programmes executed in the rural areas of Bangladesh. It needs to remember the criteria for inclusion error for each of the methods. First, the perception of the interviewer may slightly underestimate the true situation of inclusion error. Second, food expenditure method consider the lower poverty line expenditure and used the projected value of food expenditure for the year 2015 using GDP deflator. However, the food expenditure for the year 2015 may increase or decrease in real situation. Moreover, the addition of non-food allowances with this food poverty line expenditure may change the poverty condition and might have a chance to reduce the inclusion error by this criteria. Third, the inclusion error might be reduced significantly if the amount of land for considering landlessness assumed the amount of functionally landless (owning land 50 decimals or less) instead of absolute landless (owning only homestead land; and assumed here 15 decimals or less). Fourth, the estimated inclusion error by PPI value method overestimate the true situation, hence modified PPI value method should be considered for further actions. Finally, the targeting error might be reduced significantly if the poverty condition of the households could be estimated accurately since almost all the safety nets programmes targets poor in beneficiary selection.

Exclusion Error

As stated earlier, the exclusion error has been estimated using the information of sample households who claimed to be eligible to receive benefits from a particular safety nets programme but failed to include in the targeted SSNPs. The study covered information from a total of 1002 sample eligible non-beneficiary households to estimate the exclusion error. The study used several general criteria/methods to estimate the exclusion error of the eligible non-beneficiary households. Table 3 shows the percentage of exclusion error by some relevant general criteria, *viz*., food expenditure, landlessness, food security status, social status, PPI value, and modified PPI value methods against each of the programme. The exclusion error is not required to estimate by perception method as the interviewer were convinced through PRA that all these households are eligible to receive benefits from safety nets programmes.

The exclusion error by food expenditure method was obtained about 85% for *old age allowance*, about 88% for *allowances for the widowed/ deserted/ destitute women*, and 76% for a*llowance for financially insolvent disabled*. The FGD findings explore that budget constraint is the key reason for not being included all widowed women and disables in their respective programmes. The exclusion error by landlessness criteria was also found identical for these three allowance-based programmes. The findings indicate that the modified PPI value method also provide almost same amount of error that was found by the above four methods/criteria.

The exclusion error by food expenditure and landlessness criteria for the VGD candidate was found 89.3% and 91.8% respectively. The exclusion error by food expenditure and landlessness criteria was found 89.3% and 91.8% respectively for the 100days ES/EG programme for hardcore poor, may be due to budget constraint. Surprisingly, the exclusion error by food expenditure and landlessness criteria was found 82.8% and 81.3% respectively for the candidate of *stipend for primary students programme*. It is required a further rigorous investigation for the reasons of excluding these children from the education programme. Further, for the Stipend for Secondary and Higher Secondary Students programme, the exclusion error by food expenditure and landlessness criteria was found 77.8%, may be due to disobey the regulations of the programme.

The overall exclusion error estimated by food expenditure and landlessness criteria indicate that about 85% of the eligible non-beneficiary households were excluded from the targeted safety nets programmes. The high percentage of exclusion error indicates that a very significant number of households still left behind to receive the benefits from social safety nets programmes of government of Bangladesh. Therefore, budgetary allocation for SSNPs needs to be increased to cover all the needy poor households in order to reduce their vulnerability. An all-out

effort along with the increase of budget provision is essential to eradicate the poverty in order to comply the Sustainable Development Goals (SDGs).

Table 3: Exclusion error considering some general criteria of SSNP benefits

Name of the programme	Total eligible non-beneficiary HHs	% of exclusion error by different general criteria					
		Food expenditure	Land	Food security	Social Status	PPI Value	Modified PPI Value
Old Age Allowance	387	84.5	81.9	35.4	77.0	18.9	89.1
Allowances for the Widowed/ Deserted/ Destitute Women	375	88.3	90.7	45.1	88.0	19.7	93.1
Allowance for financially insolvent disabled	183	76.0	80.3	36.6	78.7	27.3	85.2
Vulnerable Group Development	196	89.3	91.8	31.6	68.9	35.7	93.4
Test Relief	8	87.5	87.5	37.5	62.5	50.0	75.0
Gratuitous Relief	6	100.0	100.0	16.7	100.0	50.0	100.0
100days ES/EG programme for Hardcore poor	15	86.7	93.3	26.7	93.3	80.0	100.0
RMP	2	50.0	100.0	0.00	50.0	100.0	100.0
REOPA	8	62.5	100.0	25.0	75.0	62.5	100.0
Primary Education Stipend Project	64	82.8	81.3	25.0	31.3	35.9	87.5
Secondary Education Stipend Programme	18	77.8	77.8	33.3	44.4	16.7	94.4
Total	1002	84.2	85.2	37.5	77.2	23.6	89.6

Regional Variation of Inclusion and Exclusion Error

The study also intends to examine whether there are any regional variations of the including error and excluding error in beneficiary selection. Table 4 shows the inclusion error considering some general criteria by greater division in order to verify the regional variation, if any. The findings indicate a wide variation of beneficiary selection in different domains (greater divisions) and by different methods. According to the perception method, the inclusion error was found highest (9.7%) in Rajshahi division and lowest (5.7%) in Dhaka division. On the other hand, the inclusion error was found highest (50%) in Chittagong division and lowest (12.3%) in Rajshahi division. The absolute landlessness criteria indicate highest percentage of error in Dhaka division and lowest in Rajshahi division.

Table 4: Inclusion error considering some general criteria by greater division

Division	Total number of Beneficiary Households	% of inclusion error by different general criteria						
		Perception	Food expenditure	land	Either land or food expenditure	Modified PPI value	PPI value	Both land and food expenditure
Chittagong	462	7.8	50.0	20.6	56.3	27.7	77.3	14.3
Dhaka	526	5.7	26.6	31.6	45.4	13.7	77.4	12.7
Khulna	498	7.2	33.1	27.3	49.4	19.3	81.5	11.0
Rajshahi	559	9.7	12.3	18.4	26.1	11.8	81.6	4.7
Total	2045	7.6	29.6	24.4	43.6	17.7	79.5	10.5

Therefore, it is hard to make any inference regarding the degree of incidence of inclusion error by greater division considering all the criteria individually. Hence, attempt has been made to find the inclusion error by consider some of the criteria together. When both food expenditure and landlessness criteria considered together, the inclusion error was found highest in the Chittagong division, followed by Dhaka division. On the other hand, the inclusion error was found lowest in the Rajshahi division. The findings of FGDs discovers that nepotism, political bias and the provision of bribe were the main reasons for inclusion error.

Table 5 shows the exclusion error considering some general criteria by greater division in order to verify whether there is any regional variation or not. Considering the absolute landless criteria, the exclusion error was found highest (90.5%) in Rajshahi division and lowest in Dhaka division (78.2%). The food expenditure method, as a proxy of poverty, indicate that lowest (71.1%) amount of exclusion error occurred in the Chittagong division and highest (95%) amount of error occurred in the Rajshahi division. Combining landlessness and food expenditure criteria together, the findings indicate the exclusion error did not vary much more across the greater division.

Table 5: Exclusion error considering some general criteria by greater division

Division	Total number of eligible non-beneficiary Households	% of exclusion error by different general criteria						
		Land	Food expenditure	Food security condition	Social status	Both land and food expenditure	Modified PPI criteria	Either land or food expenditure
Chittagong	273	86.8	71.1	93.8	89.0	64.8	86.8	93.0
Dhaka	261	78.2	84.3	92.7	66.7	69.7	87.4	92.7
Khulna	247	86.2	84.6	91.1	63.6	73.7	88.7	97.2
Rajshahi	221	90.5	95.0	96.4	90.5	86.9	96.8	98.6
Total	1002	85.2	83.1	93.4	77.2	73.2	89.6	95.2

Predictors of the Inclusion Error for Different Groups of Social Safety Nets Programmes

This section of the study is devoted to identify the determinants of inclusion errors of leading public social safety nets programmes executed in Bangladesh. As the study dealt with 14 safety nets programmes under four broad categories, therefore the study plans to explore the determinants on the broad categories instead of individual programmes. Though the inclusion error have been estimated by several methods, the households have been categorized here into two groups (correctly selected vs. wrongly selected) based on per capita food expenditure method to evaluate the impact of several covariates on wrong selection. The logistic regression model is an appropriate technique since the dependent variable is dichotomous (beneficiary households have no inclusion error=0, beneficiary households have inclusion error=1) and this model has been applied here to find out the determinants for different groups of social safety nets programmes. Therefore, the study has developed five logistic regression models for different groups of SSNPs: **Model-1** for the three social protection allowance programmes; **Model-2** for three food security related programmes; **Model-3** for three employment generation related programmes, **Model-4** for primary education stipend programme; and **Model-5** for secondary education stipend programme. It is to be mentioned that the determinants for primary education stipend programme and secondary education stipend programme may vary significantly due to their inclusion criteria, and hence Model-4 and Model-5 have been developed separately though these two programmes apparently be in the same group (human resources development).

On the basis of univariate and descriptive analysis, the models consider the covariates - sex of the household head, education of the household head, landholdings, region of residence, income of the household, religion, family type, dependency ratio, occupation of the household head in terms of working status, food security status, and social status of the household. All of the five multiple binary logistic regression models were found to fit significantly on the basis of all available tests including

pseudo R^2 values and Hosmer and Lameshow test (p-values are 0.111, 0.683, 0.974, 0.647 and 0.807 for the five models respectively). Therefore, the study has identified the predictors of inclusion error by the five multiple binary logistic regression models.

The odds ratios along with the significance status of each of five binary models are shown in Table 6 for a succinct overview of the outcome. The results indicate that almost all the predictors except working status of the household head and landholdings of the household have a significant effect on different models. And the odds ratios of each of the predictors are found to vary across the different models (Model 1 to Model 5). The variation of impacts of selected predictors on inclusion error for different groups of social safety nets programmes in terms of relative risks is discussed below:

Gender of the Household Head-Household headships by sex play an important role in determining the socioeconomic condition of the household. The gender of the household head was found significant predictor for Model-1 (Social Protection Allowance Programmes), Model-2 (Food Security Programmes) and Model-3 (Employment Generation Programmes). The likelihood of inclusion was found more than double for the male-headed households in comparison to the female-headed households, that is the male-headed households are more exposed to inclusion error for getting social safety nets benefits.

Education of the Household Head-The education of the household head might influences the socio-economic situation of the household through several channels, particularly to increase the household income. The analysis reveals that education of the household were the significant predictor for Model-3 and Model-4. The result is counter-intuitive as the risk of inclusion error was found to increase with the increase of the education of the household head for these two models. Though insignificant, the odds ratio of other three models appear natural, that is the likelihood of inclusion error was found to decrease with the increase of the education of the household head.

Landholdings of the Household-Land is the most valuable asset for rural economy, because agricultural sector is completely depends on it. The analysis indicate that landholding has no significant impact on beneficiary selection for all the five models, though the size of land is considered as a basic criteria for most of the safety nets programmes. The fact is that the size of the land of the study households are so scanty that it does not put any impact of beneficiary selection. Perhaps, this is the valid reason for insignificant effect of landholding on inclusion error.

Region of residence (Division)-Geographical location-specific features do impact on the life and livelihood of human beings both nationally and globally. This very truth is supported by the findings of the study. The findings indicate that the location as division of residence played significant role in case of all five models. The likelihood of wrong selection was found higher in the Chittagong division by all means for all the models. Interestingly, the likelihood of wrong selection was found lower in the Rajshahi division.

Income Status of the Household-The sufficient amount of household income used to play a great role in reducing economic and food vulnerability. However, the findings indicate that per capita income has put significant positive impact on wrong selection of the beneficiaries for social safety nets programmes for all the five models. The likelihood of inclusion was found many-fold higher for the households with per capita income (annual) more than Tk.10,000 in comparison to the households with per capita income $\leq$ Tk.10,000.

Religion of the Household Members-The findings show that the religion of the household members has significant impact on wrong selection of the beneficiaries for social safety nets programmes for the Model-2 and Model-4. The likelihood of inclusion error was found higher for Muslim households in comparison with non-Muslim households.

Family Type-The findings indicate that family type has put significant impact on wrong selection of beneficiaries. In comparison to the beneficiaries of nuclear family, the odds were found 3.5, 4.9, 1.9 and 5.3 times higher for the beneficiary households belonging to the joint family for Model-2 to Model-4 respectively.

Table 6: Relative risks against different category of predictors of the inclusion error for different groups of social safety nets programmes

[**Model 1**: Social Protection Allowance Programmes; **Model 2**: Food Security Programmes; **Model 3**: Employment Generation Programmes; **Model 4**: Primary Education Stipend Programme; **Model 5**: Secondary Education Stipend Programme]

Covariates/ Independent Variables	Relative Risks for Different Groups of SSNPs				
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Gender of the Household Head					
Female®	1	1	1	1	1
Male	2.538***	3.308*	15.106*	1.740	8.022
Education of the Household Head					
Illiterate/poorly educated®	1	1	1	1	1
Moderately educated	0.855	0.557	4.117*	1.184	0.936
Educated	1.460	0.384	-	2.286*	0.441
Landholdings of the Household					
≤ 15 Decimals®	1	1	1	1	1
16-50 Decimals	0.823	0.751	2.815	1.067	1.130
51 & Above Decimals	1.216	0.219	113.253	1.343	0.971
Region of Residence (Division)					
Khulna®	1	1	1	1	1
Dhaka	0.485***	2.211	0.039**	1.130	5.251***
Chittagong	1.746**	3.913***	0.269	3.212***	4.901***
Rajshahi	0.275***	0.872	0.084*	0.427**	0.738
Income Status of the Household (per capita)					
≤ Tk. 10000 (annual)®	1	1	1	1	1
Tk.10001-Tk.30000 (annual)	12.225***	5.210***	32.584***	3.399***	2.509
Tk.30001 & Above (annual)	169.58***	40.88***	3018.31***	40.16***	65.44***
Religion of the Household Members					
Non-Muslim®	1	1	1	1	1
Muslim	1.560	10.32***	9.403	2.614**	1.071
Family type					
Nuclear®	1	1	1	1	1
Joint	1.304	3.52***	4.893*	1.941**	5.311***
Dependency Ratio	0.999	1.006**	1.013*	1.002	1.002
Working Status of the Household Head					
Did not engage any work®	1	1	1	1	1
Engaged in work	1.261	1.139	0.897	0.472	0.498
Food Security Status of the Household					
Suffered from food insecurity®	1	1	1	1	1
Did not suffer food insecurity	1.990***	2.053	2.484	1.575	0.807
Social Status of the Household					
Ultra poor/poor®	1	1	1	1	1
Moderately poor/middle class	1.023	1.694	2.673	2.162***	1.013
Constant	0.013***	0.000***	0.000***	0.023***	0.015***

® Reference category; *** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level

Dependency ratio-The study included dependency ratio as continuous covariate in the models. The findings show that dependency ratio has significant impact on inclusion error for Model-2 and Model-3. That is the risk of inclusion error was found to increase with the increase in the dependency ratio of the households.

Working Status of the Household Head-The working status of the household head plays a vital role on household socio-economic condition. Surprisingly, the findings show that working status of household head has no significant impact on inclusion error for all of the five models, that is, the selection of beneficiaries did not vary with the working status of the household heads. This may happened due to the fact that most of occupations of the household heads are similar in nature and income from such activities did not put any impact to save the households from insecurity/vulnerability.

Food Security Status of the Household-The findings indicate that the food security of the household has significant impact on wrong selection of the beneficiaries for social safety nets programmes for the Model-1 and the likelihood of inclusion error was found nearly two times higher for food secured households in comparison with food insecure households. In addition to food security of the household has no significant impact on wrong selection of the beneficiaries for all others model.

Social Status of the Household-The study included social status of the household as one of the covariates. However, the findings indicate that social status of the household has significant impact on wrong selection of the beneficiaries for social safety nets programmes for the Model-4. The odds of inclusion error were found 2.16 times higher for the beneficiary households belonging to moderately poor/middle class family in comparison with ultra-poor/ poor households.

Conclusions

Based on the existing criteria for the beneficiary selection for different social safety net programmes in Bangladesh, the study explores that inclusion error was highest for income threshold for both *old age allowance* and *allowance for the widowed, deserted and destitute women.* The inclusion error was found extremely high for VGD beneficiary selection due to female-headed household criteria, followed by monthly income criteria. The error due to female-headed household was found noteworthy for the beneficiary selection for *rural maintenance programme.* The inclusion error for safety nets programmes related to relief activities was found very notable for the criteria 'household affected by natural disaster'.

The study also attempted to find the inclusion error using some general eligibility criteria viz., *perception of interviewer*, *food expenditure*, *land ownership*, *PPI value* and *modified PPI value* in addition to the programme-specific criteria. Among the five general criteria, the inclusion error was found lowest by perception method and highest by PPI value criteria for almost all the selected programmes. Accumulating the currently beneficiary households for all the programmes, the inclusion error is found 7.6% by the perception of the interviewer, 29.6% by poverty line food expenditure, 24.4% by absolute landless criteria and 17.7% by modified PPI value criteria. The findings of the study indicate that food expenditure method, landlessness criteria and modified PPI value criteria provides almost identical amount of inclusion error for different safety nets programmes. It is to be noted that the inclusion error was found extremely high by PPI value criteria using the cut-off point 35 as PPI value. The studies findings recommend to revised the cut-off point of PPI value or adopt the modified PPI value method after a thorough investigation using a large sample data. Therefore, the policy makers should give emphasis on inclusion error found by perception of the interviewer, food expenditure method and landlessness criteria. The income threshold for beneficiary selection should be revised considering the current GDP of the country.

The study also estimate the exclusion error using several general criteria/methods (food expenditure, landlessness, food security status, social status, PPI value, and modified PPI value methods) for the sample households who claimed to be eligible to receive benefits from a particular safety nets programme but failed to include in the targeted SSNPs. The amount of exclusion error was found about 80% by food expenditure method, landlessness criteria and modified PPI value criteria for *old age allowance*, *allowances for the widowed/ deserted/ destitute women*, and a*llowance for financially insolvent disabled*. Even the exclusion error was found higher for the candidate for VGD and employment generation programmes. A notable amount of exclusion error was found for PESP and SESP, may be due to disobey the regulations of the

programme. The high percentage of exclusion error indicates that a very significant number of households still left behind to receive the benefits from social safety nets programmes of government of Bangladesh. Therefore, budgetary allocation for SSNPs needs to be increased to cover all the needy poor households in order to reduce their vulnerability. An all-out effort along with the increase of budget provision is essential to eradicate the poverty in order to comply the Sustainable Development Goals. The study also explores that the inclusion error vary according to the region of residence. The inclusion error was found highest in the Chittagong division, followed by Dhaka division, and lowest in the Rajshahi division. Though there are variations observed regarding the exclusion error due to different methods, however no concrete conclusions could be made regarding regional variation of exclusion error.

Finally, the study is concerned to find the determinants of inclusion errors for leading public social safety nets programmes. Consequently, five logistic regression models has developed for different groups of SSNPs. All of the five models were found to fit significantly on the basis of all existing tests including the values of pseudo R^2 and Hosmer and Lameshow statistic. The results explore that gender of the household head, region of residence, income status of the household head and food security status have significant effect on inclusion error for social protection allowance programmes; gender of the household head, region of residence, income status of the household head, religion, family type and dependency ratio have significant effect on inclusion error for food security related programmes; gender of the household head, region of residence, income status of the household head and dependency ratio have significant effect on inclusion error for employment generation related programmes; education of the household head, region of residence, income status of the household head, religion, family type and social status of the household have significant effect on inclusion error for *primary education stipend programme*; region of residence, income status of the household head, religion and family type have put significant effect on inclusion error for *secondary education stipend programme*. The study will help to harness the effectiveness of public resources allocations to safety nets, because the findings on targeting error will assist the stakeholders to find out ways to guard against and minimize the leakages so that the valuable resources spent on the SSNPs can produce the maximum output. Finally, the study findings would contribute to a better design of public interventions that not only protect the poor but also promote their livelihoods, an overarching goal of major policy documents, particularly the Seventh Five-Year Plan and Sustainable Development Goals.

References

Ahmed, A., Gilligan, D., Kudat, A., Colasan, R., Tatlidil, H., & Ozbilgin, B. (2006). Interim impact evaluation of the conditional cash transfer program in Turkey: A quantitative assessment. *International Food Policy Research Institute, Washington, DC*.

Ahmed, I., Jahan N. and Tuz-Zohora F. (2014). Social Safety Net Programme as a Mean to Alleviate Poverty in Bangladesh. *Developing Country Studies* (4), 17.

Ahmed, S. S. (2005). Delivery mechanisms of cash transfer programs to the poor in Bangladesh. *World Bank social protection discussion paper series*, (0520).

Ahmed, S. S. (2007). 'Social Safety Nets in Bangladesh', Background Paper for Bangladesh Poverty Assessment. Mimeo (draft). World Bank, Washington, D.C.

Ali, A. (2005). *Livelihood and food security in rural Bangladesh-the role of social capital*.

Bangladesh Bureau of Statistics. (2011). Report of the household income and expenditure survey 2010. *Bangladesh Bureau of Statistics*.

Barkat, A., Gupta, S. K. S., Hussain, A. A., Rahman, M., & Ahamed, F. M. (2013). Improving the targeting effectiveness of social safety nets in Bangladesh. *Extreme Poverty Research Group (EPRG), 11*.

Begum, I. A., Akter, S., Alam, M. J., &Rahmatullah, N. M. (2014). Social Safety Nets and Productive Outcomes: Evidence and Implications for Bangladesh.

Choudhary, M. S. R. (2013). Impact of old age allowance among rural aged: An empirical investigation. *International Journal of Sociology and Anthropology*, *5*(7), 262-268.

Coady, D. (2004). Designing and evaluating social safety nets: Theory, evidence, and policy conclusions. *Food Consumption and Nutrition Division Discussion Paper*, *172*.

Devereux, S. (2002). Can social safety nets reduce chronic poverty?. *Development Policy Review*, *20*(5), 657-675.

Dorosh, P., C. delNinno and Q. Shahabuddin (2004). 'The 1998 Floods and Beyond: Towards Comprehensive Food Security in Bangladesh', A University Press Limited and IFPRI Publication.

Barkat-e-Khuda. (2011). Social safety net programmes in Bangladesh: A review. *The Bangladesh Development Studies*, 87-108.

GoB (2009). Steps Toward Change, National Strategy for Accelerated Poverty Reduction (Revised) FY 2009-11. General Economics Division, Planning Commission, Dhaka.

GoB (2013). Budget Documents 2014-15, Safety Nets, 2013-14, Ministry of Finance, Government of Bangladesh.

GoB (2014). Budget Documents 2014-15, Safety Nets, 2014-15, Ministry of Finance, Government of Bangladesh.

Grosh, M., Ninno C. del., Tesliuc E. and Ouerghi A. (2008). For Protection and Promotion: The Design and Implementation of Effective Safety Nets. The World Bank, Washington, D.C.

Hies (2010). 'Preliminary Report on Household Income & Expenditure Survey: Statistics Division', Ministry of Planning, and The Government of the People's Republic of Bangladesh.

Khan, T. H. (2013). *Political Economy of Social Safety Nets in Bangladesh*. Department of Government and Politics, Jahangirnagor University, Bangladesh.

Narayan, A., & Zaman, H. (2008). *Poverty Assessment for Bangaldesh: Creating Opportunities and Bridging the East-West Divide*. World Bank Office.

Nasreen, M., Hossain, K. M., &Kundu, D. K. (2006). The interrelationship between poverty, environment and sustainable development in Bangladesh: An overview. *Bangladesh e-Journal of Sociology*, *3*(2), 59-79.

Rahman, H. Z., Chawdhury, L. A., &Khondoker, S. A. (2011). Social Safety Net in Bangladesh: Volume I: Review of Issues and Analytical Inventory. *PPRC/UNDP (Dhaka)*.

Rahman, H. Z., & Choudhury, L. A. (2012). Social Safety Nets in Bangladesh, Volume 2: Ground Realities and Policy Challenges. *Dhaka: Power and Participation Research Centre (PPRC) and United Nations Development Programme (UNDP)*.

Slater, R. (2011). Cash transfers, social protection and poverty reduction. *International Journal of Social Welfare*, *20*(3).

Tanzina, A. (2014). 'A Study on the Effect of Social Safety Net Programme on Livelihood Pattern and Income Generation in Comilla', MS Thesis, Department of Sociology, University of Dhaka

Tietjen, K. (2003). 'Female Secondary School Assistance Project (FSSAP) – II: A Review of New Design Elements',Draft Paper for the World Bank.

Uddin, M. (2013). *Social safety nets in Bangladesh: an analysis of impact of old age allowance program* (Doctoral dissertation, BRAC University).

World Bank (2003). Sustainable Development in a Dynamic World. Transforming Institutions, Growth and Quality of Life, A web document of the World Bank.

World Bank (2006). 'Social Safety Nets in Bangladesh: An Assessment', Bangladesh Development Series – Paper No. 9, January 2006, the World Bank Office, Dhaka.

Zohir, S., B. A. Mallik, S. Zabeen and G. Ahsan (2010). 'Strengthening Social Safety Nets for Mitigating Adverse Impacts of Food Crisis in Bangladesh', Economic Research Group, Dhaka, Bangladesh.