

Productive Impacts of Selected Social Safety Net Programs in Bangladesh

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Abstract

Social safety net programs (SNPs) are non-contributory transfer programs designed to support the poor and vulnerable groups within society. In Bangladesh, SNPs are crucial for combating poverty. The objective of this paper is to estimate the productive impacts of selected SNPs at the household level in Bangladesh. Using a propensity score matching method, the study identified matched comparison groups to evaluate the impact. The outcome variables examined include: (i) changes in labour allocation/employment, (ii) income-generating activities, (iii) investments in land, tools, animals, family enterprises, durable goods and housing improvements, (iv) investments in human capital, and (v) changes in coping mechanisms. The study used data from the Household Income and Expenditure Survey for the programs of (1) old age allowance (OAA), (2) allowances for the widowed, destitute and deserted women (AWDD), (3) agriculture rehabilitation (ARP), (4) stipend for primary students (SPE), (5) stipend for secondary students (SSHE). The study found that ARP is a promising means of a safety net for marginal and small farmers. It generated significant positive impacts on farm and non-farm income-generating activities, labour allocation, and investment in agricultural assets and inputs. OAA and AWDD contributed positively to some productive outcomes, but the impacts were not significant. SPE and SSHE had minimal short-term impacts on productive outcomes but hold potential for long-term benefits through human capital development. When considering all SNPs collectively, the study found significant impacts on various productive outcomes. Beneficiaries showed greater engagement in non-farm activities while reducing their involvement in farm activities. Moreover, beneficiaries earned significantly higher income from non-farm sectors compared to the farm sector. To enhance the productive impacts of SNPs, this paper suggests that policymakers should design such interventions that bring productive outcomes. This will help not only to protect but also to promote the well-being of poor and vulnerable populations.

Key Words: Social safety nets, Productive impacts, Propensity score matching, Bangladesh

1. Introduction

The most crucial challenge facing Bangladesh is the eradication of widespread poverty. Although poverty reduction in Bangladesh has shown notable progress since the 1990s, the progress has been relatively modest. Despite the poverty rate declining by 1.7% per year at the national level, 31.5% of households were still living in poverty in 2010 (HIES, 2010). Consequently, poverty reduction remains one of the primary agendas of the government of

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Bangladesh. Like many other developing countries, safety net programs (SNPs) in Bangladesh play a vital role in poverty alleviation. SNPs are non-contributory transfer programs designed to support poor and vulnerable groups in society. These programs can be implemented by both the public sector (government and aid donors) and the private sector. Over the last few decades, many countries worldwide have adopted various SNPs to assist underserved and vulnerable populations, serving as instruments for both 'protection' and 'promotion'. In Bangladesh, SNPs are more than just necessary in combating poverty, especially as an increasing portion of the population falls into the extreme poverty category. Due to the high prevalence of shocks and the large vulnerable population, the government of Bangladesh has steadily increased safety net expenditures since the mid-1990s. However, the benefits provided by these programs remain grossly inadequate.

Safety net programs directly transfer resources to poor people. Bangladesh has a comprehensive portfolio of both food and cash-based SNPs. There are approximately 99 such programs, although the number varies depending on the source. These safety net programs can be categorised based on the specific objective they are designed to achieve. For example, programs may aim to develop infrastructure, provide educational incentives to poor students, mitigate the consequences of disasters, or offer livelihood support to disadvantaged groups such as widows, the deserted and destitute, the elderly, and people with disabilities. There are 30 public SNPs in the country covered in the Household Income and Expenditure Survey (HIES) 2010. This study focuses on interventions including (1) old age allowance, (2) allowances for the widowed, destitute and deserted, (3) agriculture rehabilitation program, (4) stipend for primary students, and (5) stipend for secondary students. Among the 30 SNPs, 5 are conditional cash transfers, 10 are unconditional cash transfers, 9 are public works or training-based cash or in-kind transfer programs, and the remaining 6 are emergency or seasonal relief programs. In developing countries like Bangladesh, where most of the poor live in rural areas and derive a significant share of their income from agriculture, agricultural development could be a key strategy to reduce poverty. One SNP is directly linked to agriculture – the agriculture rehabilitation program. This program is designed to rehabilitate small and marginal farmers and provide them with agricultural inputs such as seeds, fertilizers and farm machinery (power tillers, threshers, batch driers, irrigation pumps, etc.) through the Department of Agricultural Extension. The objective of this paper is to estimate the productive impacts of selected safety net programs in Bangladesh.

The remainder of the paper is structured as follows: Section 2 provides a brief literature review. Section 3 describes the data sources and explains the empirical methods. Section 4 presents the results and discussions, and Section 4 concludes the paper.

2. Literature Review

Safety net first entered the discourse during the 1980s in response to the (presumably short-term) adverse effects of structural adjustment programs (Adato et al., 2004). The concept gained further prominence in East Asia during the financial crisis (Paitoonpong et al.,

2008). Over the past several decades, many countries around the world have implemented SNPs to support vulnerable and underserved populations, serving as tools for both 'protection' and 'promotion'. Early proponents of SNPs viewed them as instruments of equality. Given their significance and implications for protecting the underserved, SNPs have consistently attracted considerable attention from researchers, development practitioners, academics, and policymakers.

Devereux (2002) argued that social safety nets can be conceptualized as publicly funded transfer programs aimed at 'consumption smoothing', rather than 'mean shifting', objectives. The study identified three key determinants of poverty: low labour productivity, vulnerability, and dependency. Del Ninno and Dorosh (2003) evaluated the merits of food and cash transfers using propensity score matching and found that the marginal propensity to consume (MPC) wheat is essentially zero for food for work and 0.51 for food for education programs. They also found that the MPC for wheat from small wheat transfers to poor households is approximately 0.25, while the MPC for wheat from cash transfers is zero. Sadoulet et al. (2004) explored the role of conditional cash transfer programs as risk management instruments for the poor. The Independent Evaluation Group of the World Bank (2011) highlighted that evidence from impact evaluations conducted over the past decade offers valuable lessons for designing effective social safety net programs. Grosh et al. (2010), drawing on extensive research, policy, and operational documents from academia and the World Bank's work in over 100 countries, provided practical guidance on designing and implementing safety nets. Their work includes insights on defining eligibility criteria, selecting beneficiaries, setting and paying benefits, and monitoring and evaluating programs and systems.

Matin and Hulme (2003) argued that programs such as income-generating vulnerable group development (IVVGD), which aim to protect and promote livelihoods, should be a major focus of anti-poverty strategies, as they have significantly expanded the outreach of poverty reduction activities. Ahmed et al. (2007) assessed the relative efficacy of food and cash transfers in improving the food security and livelihoods of the ultra-poor in Bangladesh, focusing on four interventions: (i) IGVGD, (ii) Food Security VGD, (iii) Food for Asset-creation component of the Integrated Food Security program, and (iv) the Rural Maintenance Program. Morshed (2009) analyzed public SNPs using secondary data and previous studies, focusing on program classification, impacts, design, coverage, targeting, leakages and management. In targeting the beneficiaries, Morshed cited Ahmed (2004), who found that 11% of participants in the public employment services (PES) program did not meet any eligibility criteria, while almost none of the beneficiaries met at least three criteria. The World Bank (2006) estimated that '27% of VGD beneficiaries were not poor'. From these findings, Morshed inferred a 26% inclusion error in the VGD program. Morshed also noted that some programs target geographically food-insecure Upazilas, which improves the likelihood of reaching the poor but excludes highly food-insecure households in less-poor areas. Ahmed and Del Ninno (2000) assessed the efficiency of two major food programs (the VGD and the Rural Development (RD) programs of the World Food Program) in terms of income and grain consumption among beneficiaries. They

concluded that these programs were inefficient in delivering food transfers, as the gap between allocated resources (cash and kind) and received resources, termed leakage, was significant. Ahmed and Del Ninno (2002) evaluated the Food for Education program and found it successfully increased enrolment, improved attendance, and reduced dropouts, with higher enrolment gains for girls than boys. Using both quantitative and qualitative approaches Alim and Sulaiman (2009) examined the role of BRAC's Polli Shomaj in improving targeting effectiveness for the 100-day employment generation program. Barkat et al. (2011) evaluated 15 major public SNPs in Bangladesh across three categories: conditional programs, unconditional programs, and education stipends. They reviewed official guidelines for eligibility, kind and amount, frequency and delivery mechanisms while also investigating the implementation mechanisms at the field level. Khandker et al. (2011) examined the impacts of rural road projects using household-level panel data from Bangladesh. They found that rural road investments significantly reduced poverty by increasing agricultural production, raising wages, lowering input and transportation costs, and increasing output prices. Begum and Wesumperuma (2012) reviewed the Old Age Allowance program in Bangladesh and found that it provided immense value to the country's poor older population by meeting basic needs, enhancing their status within families, and improving psychosocial well-being through a reliable income source.

Based on the available information, it can be concluded that there is a considerable gap in examining the productive outcomes of SNPs in households in Bangladesh. Against this backdrop, the present study aims to estimate the productive impacts of SNPs, which is expected to provide valuable insights for researchers, practitioners and policymakers.

3. Methodology

3.1 Conceptual Framework

Figure 1 illustrates the potential pathways linking the SNPs and productive outcomes. SNPs may influence productive outcomes through the following channels:

- **Human capital formation:** By facilitating the accumulation and improvement of human capital (training and educational attainment), SNPs can enhance productivity and increase employability over the long term.
- **Income generation:** By alleviating credit, savings and liquidity constraints, SNPs can encourage income-generating activities. This includes changes in labour allocation (on-farm and off-farm), investments in productive activities (e.g., use of inputs), and accumulation of productive assets (e.g., farm tools, land, livestock, durable goods, or housing improvement).
- **Risk management:** Regular and predictable provision of SNPs (cash or in-kind) can improve a household's ability to manage risk and shocks. This involves avoiding detrimental coping strategies (e.g., distressed sales of productive assets, children dropping out of school); avoiding risk-averse production strategies (safety or eat first approaches), and increasing riskier but more profitable activities (e.g., cultivating higher-value crops).

- Local economy effects: The injection of cash into local economies can stimulate product and labour markets, generating multiplier effects that benefit the broader community.
- Gender inequalities: SNP support can enhance women's participation in productive activities by addressing inefficiencies in household resource allocation and decision-making, thereby reducing gender inequalities and empowering women.

Several potential outcome variables emerge from these pathways. This study focuses on measuring productive outcomes such as labour allocation (farm vs off-farm, adults vs children), asset accumulation or protection from distress sale, changes in input use and crop production techniques, human capital accumulation, investments, and risk-coping strategies at the household level. It is important to note that while SNPs can directly influence productive outcomes, these impacts may also be mediated by external factors beyond the control of the program, such as price fluctuation, weather conditions, and access to input and output markets.

In our selected SNPs, some programs explicitly focus on income-generating interventions. For example, VGD includes a training component on income-generating activities. This training helps poor and vulnerable people acquire new skills, enhancing their productivity and income. By providing beneficiaries with higher skills, the training enables them to adopt various coping mechanisms during crises, improve their employability and strengthen their ability to bear risks. Investing often involves considering risks, and poor individuals typically avoid risky investments. SNPs help smooth consumption and enable vulnerable populations to manage greater risks. Through increased income, savings, and provision of insurance via regular and predictable transfers, SNP beneficiaries can (i) avoid detrimental risk-coping strategies, (ii) avoid risk-averse production strategies, and (iii) take greater risks by engaging in more profitable crops and/or activities. Additionally, SNPs contribute directly to asset and infrastructure creation. For example, food or cash-for-work programs support the construction and rehabilitation of rural roads and communication facilities. The labour requirements of these programs alter household labour allocation decisions and may influence the functioning of local labour markets, thus generating multiplier effects.

Cash transfer programs for education, targeted at school-going children, contribute to building lifetime human capital. Such programs attract students from poor families by reducing school dropout rates. Additionally, educational attainment fosters cognitive development and equips children from disadvantaged households with valuable skills. A reduction in dropout rates can also increase the demand for constructing additional school buildings, reflecting the program's broader impact. Cash for education programs not only improve human capital but also promote better nutritional and sound health outcomes. These factors collectively enhance productivity and improve employability in the long term.

Furthermore, all SNPs, whether or not they include explicit income-generating components, enhance people's ability to invest in productive activities, accumulate assets, reallocate labour, and adopt innovative and sustainable technologies such as new crop varieties.

By strengthening these capacities, SNPs play a significant role in reducing vulnerability and fostering resilience for the future.

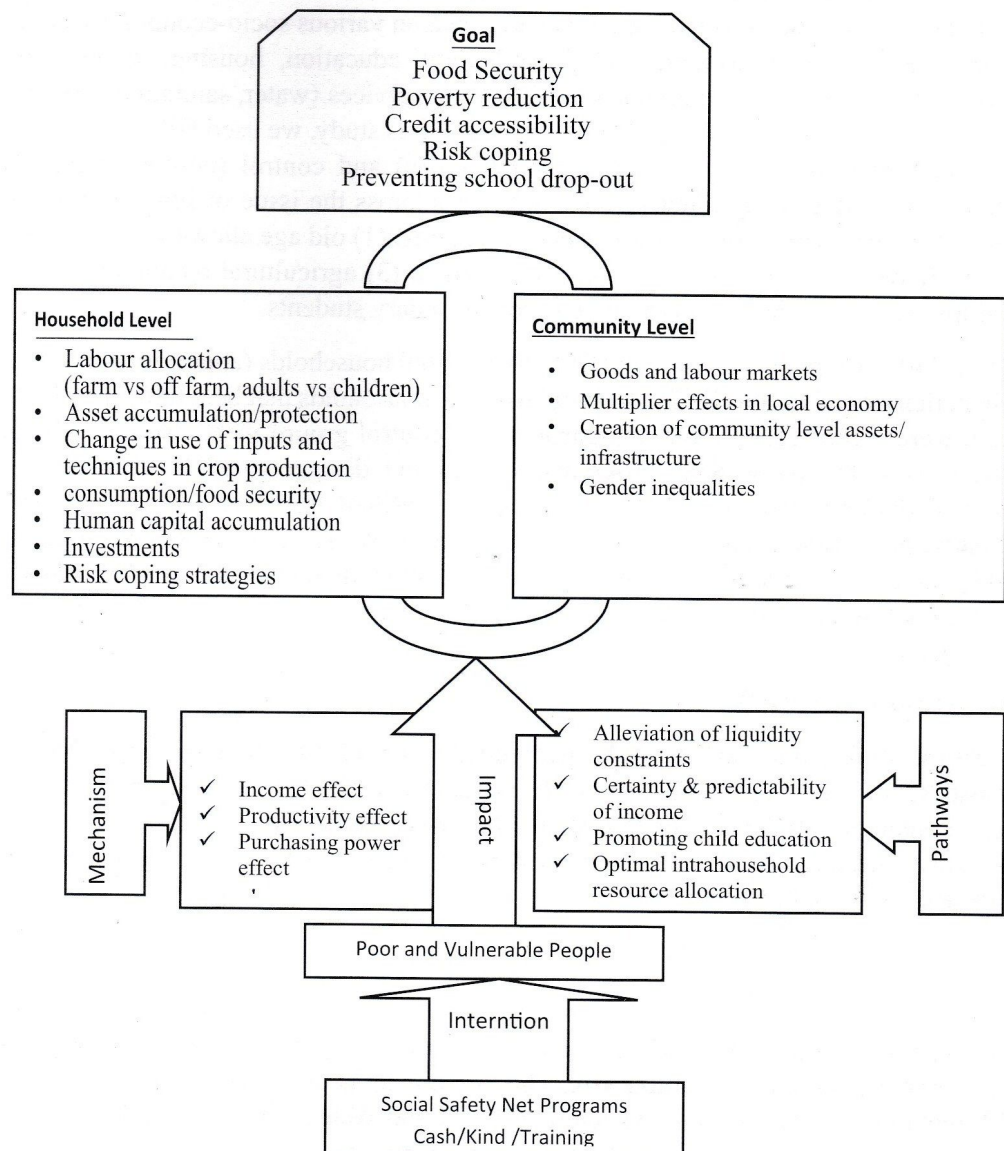


Figure 1: Conceptual framework (Source: Partially adapted from Ben Davis, 2012)

3.2 Data Sources

The main data source for this study is the Household Income and Expenditure Survey (HIES), 2010. The survey employed a two-stage stratified random sampling design. The sample comprised 612 primary sampling units (PSUs) across the country, distributed as follows: 164 PSUs in urban areas, 392 PSUs in rural areas and 56 PSUs in small metropolitan

areas. In the first stage, approximately half of the PSUs were selected. In the second stage, 20 households were randomly chosen from each selected PSU, resulting in a sample size of 12,240 households. Of these, 7,840 households were from rural areas, and 4,400 from urban areas. The survey collected comprehensive data on various socio-economic aspects, including age, sex, marital status, religion/ethnicity, education, housing, income and expenditure, consumption, employment, health, basic services (water, sanitation, electricity etc.), asset descriptions and social safety nets. For this study, we used HIES as a single cross-section data to identify treatment (beneficiaries) and control (non-beneficiaries) groups for estimating the productive outcomes. To address the issue of limited program representation, we focused on a reduced set of programs: (1) old age allowance, (2) allowances for the widowed, destitute and deserted women, (3) agricultural rehabilitation, (4) stipend for primary students, and (5) stipend for secondary students.

Out of 12,240 households surveyed in HIES 2010, 2,989 households (approximately 25%) were beneficiaries of various SNPs. To avoid overlap, households that benefit from a single program were identified. Eligible non-participants (control group) were also considered. Beneficiaries of the six selected programs were further disaggregated. Analysis of the HIES 2010 data revealed that 2,325 participants benefitted from these programs, with 1,795 participants benefitting from a single selected SNP. We selected 3,840 households in the probit model as a probable control group, excluding the treated group of 1,795 households. We analyse the impact of each program separately, as well as the combined impact of all programs.

3.3 Analytical Framework

To assess the impact of social safety net interventions on productive outcomes, we used the propensity score matching (PSM) method. The impact is defined as the difference between the actual outcome and the counterfactual outcome-what would have occurred without the intervention. Formally, the average impact of program intervention can be expressed as follows (Rubin 1974, Ravallion 2008):

$$\bar{I} = \frac{1}{n} \sum_{i=1}^n (Y_i^T - Y_i^C) \quad (1)$$

where I is the 'impact', Y represents the interpretable impact indicator, T and C represent the treatment group and control (comparison or non-treated) group respectively, i represents the sample units, and n is the sample size. The true impact is unknown because one of Y^T and Y^C remains unknown during evaluation (Dehja and Wahba, 2002). To elaborate, the phenomenon can be described using the following equation:

$$E(I|X) = E(Y_i^T - Y_i^C | X) = E(Y_i^T | X, T) - E(Y_i^C | X, C) \quad (2)$$

Where X is a vector of the covariates, and E represents expected values. This program impact is commonly referred to as the 'average impact of the treatment on the treated' (ATT).

PSM requires two key assumptions: conditional independence assumption (CIA) and the common support or overlap condition. The CIA indicates that conditional on the observable variables included in the PSMs (probit or logit models), the outcome variables are independent of treatment. In other words, the outcomes for the control group and treatment group would be the same in the absence of the SNP intervention. Therefore, variables that satisfy the CIA must be included in the analysis.

We have employed Nearest Neighbor Matching (NNM) to pair treated and untreated households. The NNM method selects households from the control group as matching partners for beneficiaries based on the closest propensity scores (Abadie et al., 2004; Abadie and Imbens 2006; Gilligan et al., 2009). Using this approach, the treated and control groups are matched to ensure the households are very similar, except for their participation in the program. The steps of the PSM process are as follows: First, select outcome variables and covariates (X) from the HIES dataset, ensuring that the X covariates satisfy the CIA. Second, apply probit regression to estimate $P(X)$, and the probability of being treated, exclude households that do not satisfy the common support or overlap condition, and finally estimate the average treatment effect using equation (2).

3.4 Productive Outcome Indicators at the Household Level

The productive outcomes of SNP at the household level chosen for analysis are (i) changes in labour allocation/employment, (ii) income-generating activities, (iii) investments in land, tools, animals, family enterprises, durable goods and housing improvements, and (iv) changes in coping mechanisms. A list of measurable outcome indicators is presented in Table 1. These outcomes are thematically divided into four categories:

Labour allocation: There is an ongoing debate about whether SNP interventions reduce work effort. To address this, we focus on selecting specific indicators to assess labour allocation. One key evaluation question is whether SNP intervention increases labour participation in both farm and non-farm sectors. We used average working hours per day per worker in farm and non-farm activities as outcome indicators to measure the impact.

Income-generating activities: A persistent concern in policy discussions surrounding safety nets is whether their provision reduces effort in other income-generating activities. Therefore, income-generating activities are included as a separate category of outcomes. These activities are assessed by indicators such as the number of total income-generating activities per household per active member, total farm income (crop, vegetables, livestock and fishery), and total non-farm income (small business, cottage, industries etc).

Investment: Household investment indicators evaluate whether the SNP interventions lead to increases or changes in the value of farm assets, land purchases, agricultural expenditures, and durable goods and housing improvements. The study measures household expenditures on tools, animals, family enterprises, durable goods, and housing improvements per person, converted into real terms.

Shock and coping indicators: Shock and coping indicators include measures such as per capita consumption, distressed sales, migration, and school dropout etc. Per capita consumption or per capita income is a useful summary measure of household welfare. However, income shocks cause consumption levels to decline in the absence of adequate shock-coping mechanisms. Since consumption tends to be less volatile than income, it can serve as a better indicator of household stability and welfare. Consumption smoothing can reflect a household's ability to cope with shocks and provide insights into differences in permanent income. Other indicators related to shocks and coping mechanisms include insurance, migration and school dropout rates.

Table 1: Measurable productive outcome indicators

Outcomes	Indicator	Measurable indicator	Imputed from HIES
Labour allocation	Relative farm employment	Average working hours per day per worker in farm activities	Calculating daily male and female hours in farm activities
	Relative non-farm employment	Average working hours per day per worker in non-farm activities	Calculating daily male and female hours in non-farm activities
	Relative male employment	Average working hours per day per male worker	Calculating daily male hours
	Relative female employment	Average working hours per day per female worker	Calculating daily female hours
Income-generating activities	Total no. of activities involved	Number of total activities per household per active member	Calculate the total number of activities for each active member of the household and add them to obtain the total for each household
	Total farm income	Per household	Calculating total farm income (crop, vegetables, livestock and fishery)
	Total non-farm income	Per household	Calculating total non-farm income (small business, cottage)
Investments	Own land per person	Own land per person	Own land per person at the household level
	Agricultural Expenditure per Household	Real expenditure on tools, animals, family enterprises per household	Calculate household expenditure on tools, animals, family enterprises, and convert into real terms
	Real expenditure on durable goods & housing improvement	Real expenditure on durable goods & housing improvements per person (may be a separate variable for the highlighted things)	Calculate household expenditure on tools, animals, family enterprises, durable goods & housing improvements per person, convert into real terms

Shock and coping mechanism	Asset sold	Dummy variable: if assets sold due to shock =1	
	Per capita consumption	The sum of the per capita value of food and non-food expenditures. As it is expected that households cope better in shock due to SSN so the variability in per capita food consumption would be lower for the beneficiary group. Thus, per capita food consumption expenditure due to the shock is considered an indicator variable.	Food expenditures are based on reports of the consumption of 33 different foods in the 14 days before the interview from purchases, stocks and amounts received as gifts, barter or in-kind payments. These quantities were converted to values using household self-reports of purchases. Non-food expenditures include purchases of fuel and lighting, cosmetics and other expenses, washing and cleaning expenses, transport/ travel and other misc. charges, ready-made garments, clothing material and tailoring, footwear, medical treatment expenses, housing-related expenses, etc.
	Insurance	Dummy variable: if the income received from insurance (life, health or general) =1	
	Migration	Dummy variable: if any family member migrates to another place =1	
	School dropout	Dummy variable: if any family member (child) drops out of school =1	

4. Results and discussion

4.1 Variables in PS Estimation

The dichotomous dependent variable is a dummy variable representing program participation (treated=1). We selected variables such as the age, gender, and education of the household head, as well as house characteristics, land ownership, and other factors considered when participants are chosen in the SNPs. Two-thirds of the 22 exogenous variables listed in Table 2 have higher standard deviations than their means, indicating wide variations. Regional dummy variables are included to account for rural and urban-specific factors that may influence selection for program participation. We used these variables, along with higher-order terms for age and education, to identify the best-specified probit models based on balancing properties.

Table 2: Observable characteristics included as dependent & independent variables

Variables	Description	Mean	Standard Deviation
Dependent variable			
Dummy	Dummy variables (Treated=1)	0.32	0.47
Independent variables			
AgeH	Age of household head (years)	46.14	14.26
EduH	Education of household head (years of schooling)	2.78	3.96
EduHD	Household head is illiterate=1	0.62	0.49
Land	Owned land (decimal)	35.87	92.66
LandO	Operated land (decimal) (land+lease in – lease out)	54.45	107.11
FishD	Dummy variable (Income from fish=1)	0.15	0.36
FamS	Total household size	4.48	1.83
Ch1514	No of Children 5-14 years	1.12	1.08
Male65	No of males 65+ years old	0.12	0.33
Female62	No of females 62+ years	0.15	0.36
FemaleP	Female % in household	52.03	19.28
Disable	Member disable=1	0.12	0.33
Deprat	Dependency ratio	82.68	70.26
DayL	At least a member works as day labour=1	0.03	0.18
mstatF	Women currently unmarried, separated, divorced etc. =1	0.21	0.40
Elect	Electricity connection=1	0.24	0.43
Room	Room per person in the household	0.48	0.50
Landless	Dummy variable (landless=1)	0.66	0.47
Homeless	Dummy variable (homeless=1)	0.10	0.30
R1	Regional dummy (Rural=1)	0.69	0.46
R2	Regional dummy (Urban municipality=1)	0.22	0.42
R4	Regional dummy (Urban SMA=1)	0.08	0.27

4.2 Impact of all selected SSNPs

The impact of all selected SNPs on the outcome variables is presented in Table 3. Various indicators were analysed across four areas: labour allocation, income-generating activities, investment and shock coping strategies. The average treatment effect on the treated (ATT) was significant for income-generating activities (farm), labour allocation (farm self-employment), and investment (agricultural inputs). Interestingly, access to credit was found to reduce the reliance on the safety net. These findings indicate that the SNP system is significantly contributing to productive outcomes. This suggests that policymakers should view the SNP system as encompassing a diverse set of interventions to maximize its impact.

Table 3: Impact of selected SNPs on productive outcomes

Outcome indicators	Beneficiary households (treatment)	Non-beneficiary households (control)	ATT	t value
Number of farm activities	0.46	0.57	-0.12***	-3.61
Working hours per day	12.68	12.10	0.58	1.51
Number of non-farm activities	1.88	1.62	0.27	3.12
Self-employed in farm activities	0.43	0.70	-0.26***	-5.68
Self-employed in non-farm activities	0.47	0.40	0.07	1.80
Salary of non-farm activity (Tk.)	22802.31	15296.02	7506.29***	3.08
Income from crop production (Tk.)	13826.44	25079.59	-11253.14***	-4.52
Income livestock production (Tk.)	3350.57	5229.11	-1878.54	-1.75
Value of agricultural assets (Tk.)	2980.84	7504.59	-4523.76	-1.59
Spending on fertilizer use (Tk.)	886.08	1475.50	-589.42***	-3.45
Total credit (Tk.)	9576.39	9894.30	-317.91	-0.17
Asset sold	0.03	0.04	-0.01	-1.10
Land purchased	0.02	0.03	-0.01	-0.82
Non-food expenditure (Tk.)	48777.29	46348.63	2428.67	0.68
Expenditure on durable goods (Tk.)	4380.38	6674.58	-2294.20	-1.13
Food expenditure (Tk.)	447919.63	451198.02	-3278.39	-0.24
Education expenditure (Tk.)	1065.98	990.20	75.78	0.58

4.3 Impact of Individual Programs

At the individual program level, the analyses revealed the following findings. Out of 17 outcome indicators, OAA had a positive but statistically insignificant impact on five productive outcomes: number of non-farm activities, self-employed in non-farm activities, value of agricultural assets, total credit and expenditure on durable goods. AWDD showed a positive but statistically insignificant impact on several non-farm activities: self-employed in non-farm activities, salary from non-farm activities, income from crop production, spending on fertilizer use, total credit and assets sold. Although OAA and AWDD contributed positively to labour allocation in non-farm activities and facilitated investment in agricultural assets, these results were not statistically significant, preventing firm conclusions regarding their impact on productive outcomes. Access to credit may also have increased due to OAA and AWDD, but this remains inconclusive. ARP significantly influenced several farm-related activities: the number of farm activities, self-employment in farm activities, income from crop production, income from livestock production, value of agricultural assets, spending on fertilizer use, land purchased, and food expenditure. However, ARP had a negative and significant impact on several non-farm activities and self-employment in non-farm activities. Despite this, the analysis suggests that ARP serves as an effective safety net for marginal and small farmers. The average treatment effects on the treated (ATT) for ARP demonstrated significant positive impacts on: income-generating activities (farm and non-farm), labour allocation (farm and non-farm self-employment), and investment (agricultural assets, inputs). SPE had

a positive and significant impact on: self-employment in non-farm activities, indicating that beneficiary households used the stipend for small trading. SSHE had a positive and significant impact on: income from crop production, income from livestock production, spending on fertilizer use, total credit and education expenditure. Beneficiary households appeared to use the stipend for investments in crops and livestock production. ATT for SSHE was significant for: non-farm self-employment and investment in agricultural assets.

Overall, the safety net in primary and secondary education programs (SPE and SSHE) appears to have a limited short-term impact on productive outcomes. However, in all the selected SNPs, several non-farm activities and salaries from non-farm activities were positively and significantly influenced. This indicates that beneficiary households engaged more in non-farm activities, highlighting the potential of these programs to support non-farm income generation.

Table 4: Impact of selected SSNPs on productive outcomes

Outcome indicators	OAA	AWDD	ARP	SPS	SSHSFS	All SNPs
Number of farm activities	-	-	+*	-	+	-*
Working hours per day	-	-	-	-	-	+
Number of non-farm activities	+	+	-*	+	-	+*
Self-employed in farm activities	-	-	+*	+	+	-*
Self-employed in non-farm activities	+	+	-*	+*	+	+
Salary of non-farm activity (Tk.)	-	+	+	+	+	+*
Income from crop production (Tk.)	-	+	+*	-	+*	-*
Income from livestock production (Tk.)	-	-	+*	+	+*	-
Value of agricultural assets (Tk.)	+	-	+*	-	+	-
Spending on fertilizer use (Tk.)	-	+	+*		+*	-*
Total credit (Tk.)	+	+	-	+	+*	-
Asset sold	-	+	+	-	+	-
Land purchased	-	-	+*	-	+	-
Non-food expenditure (Tk.)	-	-	-	-*	-	+
Expenditure on durable goods (Tk.)	+	-	+	-	+	-
Food expenditure (Tk.)	-	-	+*	-	+	-
Education expenditure (Tk.)	-	-	+	+	+*	+

Note: '*' = Significant.

5. Conclusions

It is evident from the quantitative analyses that SNPs have had a significant impact on labour allocation, income-generating activities, investment and coping mechanisms. While not all programs are explicitly designed to yield productive outcomes, some have shown a considerable positive influence on beneficiaries' productivity. Programs related to primary and secondary education have had limited short-term effects on productive outcomes. In

contrast, the Agricultural Rehabilitation Program (ARP) emerges as a highly promising safety net for marginal and small farmers, with significant positive impacts on income-generating activities (farm), labour allocation (farm self-employment), and investment (agricultural inputs). Other SNPs may not have a strong impact on productivity, but they still deliver positive contributions. These findings suggest that safety net programs are valuable tools for supporting vulnerable groups. To enhance the effectiveness of SNPs in Bangladesh, the following recommendations are made: i) clearly define the scope and objectives of social safety nets, ii) Increase the amount of benefits provided through safety net programs, iii) Incorporate training components into SNPs alongside cash or in-kind support and iv) establish and maintain a strong management information system (MIS) to monitor program effectiveness. These recommendations aim to maximize the productive outcomes of SNPs, ensuring that they better serve the vulnerable populations they are designed to support.

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