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The Impact of National Home Grown School Feeding Programme (NHGSFP) on Rural Communities in Nigeria

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Abstract

The purpose of this paper is to critically examine the national home grown school feeding programme (NHGSFP) in Nigeria. Its special focus is to investigate the impact of NHGSFP on rural communities in Nigeria. This paper adopts a survey research technique, aimed at gathering information from a representative sample of the population, as it is essentially cross-sectional, describing and interpreting the current situation. A total of 2400 households were sampled across the six geopolitical regions of Nigeria. The results from the use of a combined propensity score matching and logit model indicate that NHGSFP makes significant contributions to improving the health and educational status of rural school children, stimulate job creation and boost rural economy. This implies that a well-designed and integrated home grown school feeding programme can make significant contributions to improving food security at the household level, spurring job creation and boosting agricultural markets. This suggests the need for a purposeful engagement and support from all stakeholders to ensure the success of home grown school feeding programmes. This research adds to the literature on school feeding in low-income countries. It concludes that school feeding programmes have been shown to directly increase the educational and nutritional status of recipient children, and indirectly impact the economic and social lives of themselves and their family.

Keywords: School feeding programme, propensity score matching, logit model, rural communities, sub Saharan Africa.

Paper type Research paper

1. Introduction

School feeding programmes have been defined as targeted social safety nets that provide both educational and health benefits to the most vulnerable children, thereby increasing enrolment rates, reducing absenteeism, and improving food security at the household level (World Bank, 2013). According to WFP (2020), home grown school feeding programs can significantly contribute to the achievement of the sustainable Development Goals (SDGs), particularly SDG 2 (on ending hunger, achieving food security and improved nutrition, and promoting sustainable agriculture) and SDG 4 (on quality education). In acknowledgement of this, numerous governments and regional organizations, including the African Union and the Community of Latin America and Caribbean States, are including these initiatives in their strategies for achieving food security and implementing the 2030 Development Agenda (African Development Report, 2015; McEwan, 2013; Uduji *et al,* 2020; Atta and Manu, 2015). In 2004, the Federal Government of Nigeria (FGN) piloted the implementation of Home Grown School Feeding beginning with 12 States selected from the six geo-political zone of the country (OSHGSFP, 2018). In 2016, the National Home Grown School Feeding Programme (NHGSFP) was inaugurated by the Federal Government of Nigeria (FGN) to provide a nutritious and balanced meal to 5.5 million school children grades 1 to 3 (NHGSFSP, 2016). The programme aims to improve the enrollment of primary school children and reduce the drop-out rate, currently estimated at over 30 percent (Taylor and Ogbogu, 2016; Alabede *et al,* 2020). Most of this shortage is due to poverty and this programme is built to address the most important basic need of school children and provide the nutrition needed to engage successfully with their education (Adebisi *et al,* 2019; WFP, 2021; Uduji and Okolo-Obasi, 2021).

By connecting the programme to local food supply chains, the community is engaged to create a social support beyond simply providing meals to certain children, and over 44, 000 cooks are engaged in the programme, feeding over 4 million school children in the 36 States of Nigeria and Federal Capital Territory (NHGSFSP, 2016). The purpose is a cycle of productivity, sustaining and linking local farmers to nationwide and global markets while equipping the next generation with the sustenance essential for education and growth. As a result, local economies would be directly stimulated in various sectors, from education to the service industry to the agriculture sector; while education attainment and acquisition of skills would be encouraged and supported among the school children (FAO, 2016; Ahmed and Crosdale, 2021). According to FGN (2020), over 300 million meals have been served to more than 7.5 million pupils in 46, 000 public schools in Nigeria. However, the emergence of NHGSFSP in Nigeria has largely been seen

as a strategy employed by the FGN to deflect public criticism of their behavior in the failure of the Universal Basic Education Commission (UBEC) to disburse funds to pilot States as well as non-remittance of counterpart funds from participating States (Alabede *et al,* 2019). As a concept, NHGSFP in Nigeria has been intensely criticized, and there is now vehement debate over its utility and practical implications. While proponents view NHGSFP as a way to help poor children get enough to eat while giving them an incentive to be in school, critics see it as a platform for new functions to be demanded of old institutions (Taylor and Ogbogu, 2016; Adebisi *et al,* 2019; Alabede *et al,* 2020; Uduji and Okolo-Obasi, 2021; Uduji *et al,* 2019h, 2020). This difference in perceptions invariably sets the context for the NHGSFP debate, pitting those in favour of preserving a sustainable school feeding programme that will establish a safety net for the poor and eradicate malnutrition in school age children, and stimulating the national agricultural economy; against those who insist that lack of supporting infrastructure such as water, sanitation and hygiene facilities should be addressed first to herald involvement and participation of rural communities.

Subsequent to the preceding differing points of the NHGSFP initiatives in Nigeria and apparent gap in the literature, the positioning of this research has five main objectives which are consistent with the federal government of Nigeria Home Grown School Feeding Strategic Plan 2016-2020 relative to the SDGs agenda:

1. Analyse the level of federal government's interventions in the NHGSFP across the rural communities in the states of the Nigeria
2. Assess the impact of NHGSFP on basic education enrollment and school attendance in the rural communities across the states of Nigeria.
3. Determine the impact of NHGSFP in reducing the incidents of child labour, forced labour and child trafficking in rural communities across the states of Nigeria.
4. Assess the gaps in the implementation of the NHGSFP across the rural communities in the states of the Nigeria
5. Determine the consequences of reducing the incidents of child labour, forced labour and child trafficking across the rural communities in states of Nigeria.

In the light of the above, this paper adopts a survey research technique, aimed at gathering information from a representative sample of the population, as it is essentially cross-sectional, describing and interpreting the current situation. The results from the use of a combined propensity score matching and logit model indicate that NHGSFP makes significant contribution

to improving the health and educational status of rural school children, stimulate job creation and boost rural economy. This implies that a well-designed and integrated home grown school feeding programme can make significant contribution to improving food security at the household level, spurring job creation and boosting agricultural markets. This suggests the need for a purposeful engagement and support from all stakeholders to ensure the success of home grown school feeding programmes.

The rest of this paper is organized as follows: Section 2 focuses on the literature and theoretical underpinning. Section 3 describes the method and materials. Section 4 presents the results and corresponding discussion. Section 5 concludes with implications and future research directions.

2. Literature and theoretical underpinning

2.1 Literature

According to Sitali (2021), home-grown school feeding programme (HGSFP) is an intervention programme to link agricultural development with school feeding. It constitutes a school feeding model which relies mostly on external funding or rather foreign food aid, especially in developing countries (McEwan, 2013). HGSFP is generally considered primary as education intervention that facilitates equal access to education and learning opportunities (Karisa and Ordho, 2014). It is an established development intervention with several objectives including education, nutrition, health and value transfer (Ahmed, 2004). HGSFP has been implemented in different parts of the world with different purposes. According to Bundy *et al* (2009), the variation on purpose is determined by the need, resources and policies in given country context. It is a vision to reduce hunger among school children, so that hunger is not an obstacle to their development (Diallo, 2012). This has provoked further studies of how school feeding should be implemented in developing countries to reach all hungry school children in need, in a way that is sustainable (Langinger, 2011; Mwenda and Gori, 2019; Sumberg and Sabates-Wheeler, 2011). Hence, recent rethinking by the World Bank and World Food Programme incited a shift toward long-term, sustainable solutions that depend more upon local resources, local capacity, and community participation (Evans and Harper, 2009). The excogitation for linking school feeding to local agricultural production as a way to enhance the sustainability of the programme starts with the need shift to national ownership through Home-grown school feeding (Sitali, 2021; Karisa and Orodho, 2014; Ahmed, 2004; Evans and Harper, 2009; Bundy *et al,* 2009; Diallo, 2012).

2.2 Theoretical underpinning

The home-grown school feeding concept has been endorsed by scholars, development agencies and policy makers as one of the key programmes in the provision of meals in schools (WFP, 2020; 2021). It is designed to provide children in schools with diverse and nutritious food, sourced locally from smallholders farmers; which has the potential to contribute to the achievement of the sustainable development goals (SDGs) related to food security, nutrition, education, health and agriculture (World Bank, 2013; Taylor and Ogbogu, 2016; Atta and Manu, 2015; Adebisi *et al,* 2019; Ahmed and Crosdale, 2021; Alabede *et al,* 2020). Though, this paper embrace quantitative methodology; the receipt typically is the research design that provides the paper structure and logic; guiding the process of developing new knowledge and offering conventions for reporting the key element of the study; so that the referees can evaluate the robustness of this process by reference to establish convention in the existing literature; we viewed the outcome from the programme theory of the intervention (Masset and Gelli, 2013;

Gelli *et al,* 2016). The programme theory of the intervention argue that school feeding interventions linked to smallholder agriculture can have multiple effects on the following areas: (i) increasing school enrolment, attendance and reducing drop-out, and improving cognition and learning achievement; (ii) improving nutritional status of school age children; (iii) supporting incomes of recipient households (those consuming food); and (iv) supporting incomes of caterers and cooks involved in the food service provision.

3. Method and materials

Using a quasi-experimental design, the study employed a quantitative method given the scarcity of quantitative data on the intricacies of the NHGSFP impact in the country (Uduji and Okolo-Obasi, 2017, 2018a, 2018b, 2018c; Uduji *et al,* 2019a, 2019b, 2019c, 2019d, 2019e, 2020b).

3.1 Data

This study required data triangulation at multiple levels, hence, both primary and secondary data were used. The core data was obtained from the primary source where we adopted participatory rural appraisal technique in data collection. Structured questionnaire were administered to the selected households in a form that represents a suitable tool to assess qualitative issues by quantitative information. Twelve States, (two from each geopolitical zone of the country), were selected based on prevalence of child labour, forced labour and child trafficking. We used two set of questionnaires to collect data from 2400 households. The first 1200 was from households in communities where NHGSFP has been implemented (the treatment group), while the other 1200 households were from communities where NHGSFP has not been implemented (the control group). These questionnaires were administered by the researchers with the help of local research assistants. The use of research assistants was based on three major reasons. First, the study area is multi-ethnic and multi-lingual with over 250 ethnic groups that speak different local languages and dialects. Secondly, some of the terrains have been noted with high level of violence that would necessitate a guide/guard assistance. Third, some of the questions in the questionnaire would require further explanation that could be best done in local dialects.

Based on this questionnaire, we assigned scores according to the objectives of the study. The survey helped to gauge the mood of respondents on effects of reforms associated with the implementation of the NHGSFP, potential and actual constraints facing the NHGSFP in the country. Data generated from this primary source was complemented by secondary data that was obtained during the spot visits paid to key institutions (ministries, departments and agencies (MDAs) involved in policy design and implementation relating to child labour, forced labour and human trafficking in Nigeria. Other secondary data sources accessed were documents in the hands of institutions involved in research and advocacy relating to child labour in Nigeria. The secondary data mostly gave us insight into the pre NHGSFP position of both the treatment and control. The combined desk reviews and secondary data analysis not only provide the trends, but also elasticities that provided useful behind-the-scene econometric information that complemented what we obtained from the policy documents.

3.2 Primary data sampling procedure

Multi-staged sampling method was adopted for the primary data collection. In the first stage, States were clustered according to the six geopolitical zones of the country to ensure that no zone is left out. In the second stage, we used purposive sampling method to select two States from each of geopolitical zones. This purposive was based on the prevalence of child labour and human trafficking as obtained from the National Agency for the Prohibition of Trafficking in Persons (NAPTIP) documents. To this, we selected Kogi and Kwara States, (North-Central), Borno and Adamawa States (North-East), Kaduna and Jigawa States (North-West), Enugu and Imo States (South-East), Rivers and Edo States (South-South), as well as Lagos and Ekiti State (South-West). In the third stage, we randomly selected four local government areas (LGAs) from the list of LGAs in each of the selected States. In the fourth stage, to ensure proper representation, we choose randomly three communities from the list of communities in the selected LGAs. With this, we selected a total of one hundred and forty-four communities from which we engaged the help of the community leaders to randomly select two thousand, four hundred (2400) respondents (Table 1).

Table 1. Sample size determination table

States	Household Population	% of Total Population	Sample Per state	Treatment	Control
Borno	837,169	8.49	204	102	102
Adamawa	606,919	6.15	148	74	74
Kogi	639,070	6.48	156	78	78
Kwara	456,128	4.62	111	55	55
Kaduna	1,178,909	11.95	287	143	143
Jigawa	832,595	8.44	203	101	101
Enugu	630,160	6.39	153	77	77
Imo	772,679	7.83	188	94	94
Rivers	1,043,418	10.58	254	127	127
Edo	605,085	6.14	147	74	74
Lagos	1,792,943	18.18	436	218	218
Ekiti	467,257	4.74	114	57	57
	9,862,332	100	2,400	1,200	1,200

Source: NPC, 2007/Authors' computation

3.3Analytical framework

Both descriptive and inferential statistics were used to analyse the data collected and achieve the objectives of the study. Objectives 1, 4 and 5 was achieved using descriptive statistics, while

objectives 2 and 3 were achieved using inferential statistics which combined both propensity score matching (PSM) and logit model in the analysis. We choose PSM for this study because in its simplest form, PSM involves predicting the probability of treatment on the basis of observed covariates for both treatment and control group samples (Rawlings and Schardy, 2002). Previous studies suggest that most test done with good data indicate that to a great extent, PSM can reduce the overall bias, and therefore outclasses other regression based methods (Raviallion, 2001, Singh, 2006, Mishra and Alok, 2017).

3.3.1 Econometric model

The emphasis of this empirical analysis is to examine the impact of NHGSFP on basic education enrolment and school attendance, reduction of the incidents of child labour, forced labour and child trafficking in rural communities across the States of Nigeria. To achieve these, we expressed a standard logit with marginal effect. This is to help us estimate what the determinants of access to NHGSFP are. To this, the logit that assess the decision of a household to either participate in the NHGSFP or otherwise is specified thus:

$Y_i = \beta X_i + \mu_i$ (1)

This model shows that, Yi= 1 if household i gets to be involved in the NHGSFP and 0 otherwise (Yi=0 if household i is not participating in NHGSFP)

The above model has a binary outcome of the probability of a Nigerian household having access to NHGSFP (Yi) as explained by certain set of factors (Xi) which are considered exogenous to the individual household as expressed in this form:

$P(Y_i = 1) = f(X_i\beta_i)$ (2)

$P(Y_i = 0) = 1 - f(X_i\beta_i)$ (3)

In equation 2 and 3,

Yi= the response of household i that participate in the NHGSFP or not and,

Xi= the set of characteristics associated with household i.

The probability is estimated in the logit model as follow:

$P(Y = 1) = \frac{e^u}{1+e^u}$ (4)

And

$P(Y = 0) = \frac{e^u}{1+e^u}$ (5)

Where $u = \beta_i X$ = the probability model, i.e the regression of the conditional expectations of Y on X. In this study, we repeated the same treatment for all the dependent variables while estimating binary treatment and binary outcome model using the propensity score matching. In

doing this to model the household involvement or not in the NHGSFP as a joint decision, the issue of endogeneity was addressed based on previous studies (Okolo-Obasi and Uduji, 2021; Okolo-Obasi *et al,* 2021; Uduji *et al,* 2019a, 2019b). In the propensity score matching, we created value of the probability of participating in the scheme from the logit regression assigning each household a propensity score.

In estimating the impact of NHGSFP in reducing child related societal ills, we identified two groups, the control and treatment groups. Households from the communities where NHGSFP is being implemented is the treatment group while households from the communities where NHGSFP is not being implemented is the control group. In this study we denoted the treatment group as R_i =1 for Householdi, and the control group as R_i = 0. Based on the propensity score as determined by the logit above, we matched the treatment groups to the control group; that is, the probability of participating in the NHGSFP in the face of certain observed characteristics.

Therefore:

$$P(X_1) = Prob\left(R_2 = \frac{1}{X_2}\right)(0 < P(X_2) < 1) \quad (6)$$

Where X_1 is a vector of control variables that were there before the NHGSFP started. This is if R_1's are independent over all 1 and the outcomes are independent of NHGSFP given X_1, then outcomes are also independent of NHGSFP given $P(X_1)$, just as they will do if NHGSFP is implemented randomly. In the study, we noted our onuses to sidestep the observable selection bias by matching on the probability of the treatment (covariates *X)* so as to draw a more acceptable conclusion about the NHGSFP impact on the subject matter. With this in mind, we defined the propensity scores PS of the vector X as:

$$P(X) = Prob\left(Z = \frac{1}{X}\right) \quad (7)$$

Where Z = the treatment indicator = 1, if the chosen household participate in NHGSFP, and 0 if not. For the fact that propensity score is a balancing score, both the treatment and control will receive the same observable covariate *X* so that the variances between the two is seen as a result of the treatment. This difference between treatment and control groups is estimated by the average treatment effect on the treated (ATT). The true ATT, based on PSM is written thus:

$$ATT_{PSM} = E_{P(X)}\{E\left(\frac{y_1}{Z} = 1, P_{(X)}\right) - E\left(\frac{y_0}{Z} = 0, P_{(X)}\right)\} \quad (8)$$

EP(X) stands for expectation with respect to the distribution of PS in the population. The true ATT shows the mean difference in reducing child labour and increasing school enrolment. In this, we achieve a suitable match of a participant with her counterfactual in as much as their observable characteristics are identical. To ensure the robustness of our study, we checked the

matching estimators' quality by standardized differences in observables' means between the treatment and control. We Represented difference in percentage after matching with X for the covariate X, the difference in sample means for the treatment group ($\acute{X}_1$) and matched control group as ($\acute{X}_0$). Following the findings of Rosenbaum and Rubin (1985), we put the sub-samples as a percentage of the square root of the average sample variance as: $(\int_1^2 and \int_0^2.)$.

Therefore:

$$|SD = 100 * \frac{(\acute{X}1 - \acute{X}0)}{\left(.05 \int_1^2 and \int_0^2.)1/2\right)} \quad (9)$$

We assumed an overall success of 95% as we acknowledged a remaining bias of about 5% after matching, even when there is no obvious threshold of effective or failed matching. This was taken as a sign that the balance among the different observable characteristics between the matched groups is adequate. This problem of hidden bias was abutted by the bounding approach as we complemented the logit model to estimate propensity score by a vector *U* comprising of all unobservable variables and their effects on the probability of increasing school enrolment which is then captured by γ:

$$P_{(X)} = \Pr\left(Z = \frac{1}{X}\right) = F\left(X\alpha + U_\gamma\right) = e^{X\alpha U_\gamma} \quad (10)$$

With sensitivity analysis, we looked at the strength of the influence of γ on participating in the NHGSFP in order to decrease its impact on potential outcomes. Simply put, the postulation is that the unobservable variable is a binary variable taking values 1 or 0. Thus, the receiving probability of both household is applied in line with the bounds on the odds ratio as stated thus:

$$\frac{1}{e\gamma} \leq \frac{P(Xm)(1-P(Xn))}{P(Xn)(1-P(Xm))} \leq e\gamma \quad (11)$$

On this note, each of the households have the same probability of participating in the NHGSFP provided they are identical in X, only ife 1

4. Results and discussion

We begin this analysis with a description of the social and economic respondent household head variables which helped us in understanding the differences in the socio-economic status of the treatment and control Groups.

4.1 Descriptive analysis

Analysis (Table 2) show the social (education), demographic (age, marital status, household size) and economic (occupation, income) characteristic of the respondent household heads. The socio-economic characteristics are common among both the households in the communities participating in NHGSFP (treatment) and the households in communities not yet participating in the programme(control). These characteristics vital are to aid the understanding of the differences in the socio-economic status of the household heads in the treatment group compared with their counterparts in the control group.

The analysis points out that about 38% of the household heads in the treatment group are females and 62% are males. While on the other hand (control), about 67% are males with 34% females. In all, about 9% of the population (8% Treatment and 10% control) are employed to receive pay, either by government or private enterprises. About 15% on average (10% treatment and 20% control) are totally unemployed while the remaining 75% are self-employed. The average age of the respondent household heads in the treatment group is 34 years, while that of the control is 36 years. About 28% of the respondents in the treatment group are not educated at all, while 72% have at least basic education. In the control group, about 30% are not educated, while 70% have basic education at least. This shows that education enrolment appears to be more spread in the past years when compared with the present enrolment among children which is dwindling. This finding authenticate the NHGSF programme aims to improve the enrolment of primary school children in Nigeria and reduce the current dropout rates from primary school which is estimated at 30% (NHGSFSP, 2016). The analysis also shows that only about 8% of the respondents in treatment group earn more than 300,000, while the control group has about 7% that earn same amount;18% of the respondents in the treatment earn between 251,000 and 300,000, and only 11% in the control. This suggests that the respondents in the control group could need the NHGSFP more than those in the treatment group.

Table 2. Socio-economic characteristics of the respondents

	Treatment Group			Control Group		
Variables	**Freq**	**%**	**Cum**	**Freq**	**%**	**Cum**
Sex of Respondent						
Male	696	62	62	732	67	67
Females	504	38	100	468	34	100
	1200	**100**		**1200**	**100**	
Primary Occupation						
Fishing	75	6	6	125	10	10
Trading	430	36	42	368	31	41
Farming	322	27	69	160	13	54
Paid Employment	98	8	77	115	10	64
Handicraft	150	13	90	190	16	80
Unemployed	125	10	100	242	20	100
	1200	**100**		**1200**	**100**	
Age of Respondents						
Less than 20 years	30	3	3	103	9	9
21-30 years	120	10	13	215	18	27
31-40 years	310	26	38	396	33	60
41 - 50 years	340	28	67	296	25	84
51 - 60 years	280	23	90	113	9	94
Above 60 Years	120	10	100	77	6	100
	1200	**100**		**1200**	**100**	
Level of Education						
None	332	28	28	354	30	30
FSLC	452	38	65	489	41	70
WAEC/WASSCE	341	28	94	276	23	93
Degree and above	75	6	100	81	7	100
	1200	**100**		**1200**	**100**	
Marital Status						
Single	152	13	13	176	15	15
Married	776	65	77	820	68	83
Widow	118	10	87	88	7	90
Divorced/Separated	154	13	100	116	10	100
	1200	**100**		**1200**	**100**	
Household Size						
1-4 Person	650	54	54	612	51	51
5-9 Person	360	30	84	344	29	80
10-14 Person	122	10	94	172	14	94
15 Person and above	68	6	100	72	6	100
	1200	**100**		**1200**	**100**	
Annual Income						
1000 - 50,000	52	4	4	194	16	16
51,000 - 100,000	105	9	13	126	11	27

101,000 - 150,000	223	19	32	198	17	43
151,000 - 200,000	224	19	50	227	19	62
201,000 - 250,000	280	23	74	245	20	83
251,000 - 300,000	218	18	92	132	11	94
Above 300,000	98	8	100	78	7	100
	1200	**100**	**200**	**1200**	**100**	

Source: Authors' compilation based on household survey.

Analysis (Table 2) shows the average annual income of both the treatment group and the control groups is still very low and Nigeria must adopt a commitment to lowering poverty by 2030. This finding give consent to African Development Report (2015) in that eliminating extreme poverty over the next 10-15 years, would require Africa to at least double average per capita consumption from what it is today. At the same time, most countries would require less than 5% of their national income to lift poor people out of poverty.

Analysis (Table 2) also shows that the treatment group has an average income of NGN160, 000 (USD 400) per annum while for the control group, the average income is NGN155, 000 (USD 370) per annum. This suggests that both in the treatment and control group majority are living below the poverty line and cannot afford good meals, hence the NHGSFP in combination with the government's free basic education is expected to enhance school enrolment. This finding arrive at a settlement with FAO (2016) in that the cost of school feeding programmes, which can double the cost of educating a child, needs to be viewed in the context of how it helps children; overall, feeding programmes would help pupils by cutting their hunger; the promise of food would encourage them to come to school and, once in school and fed, they would be better able to concentrate on their education.

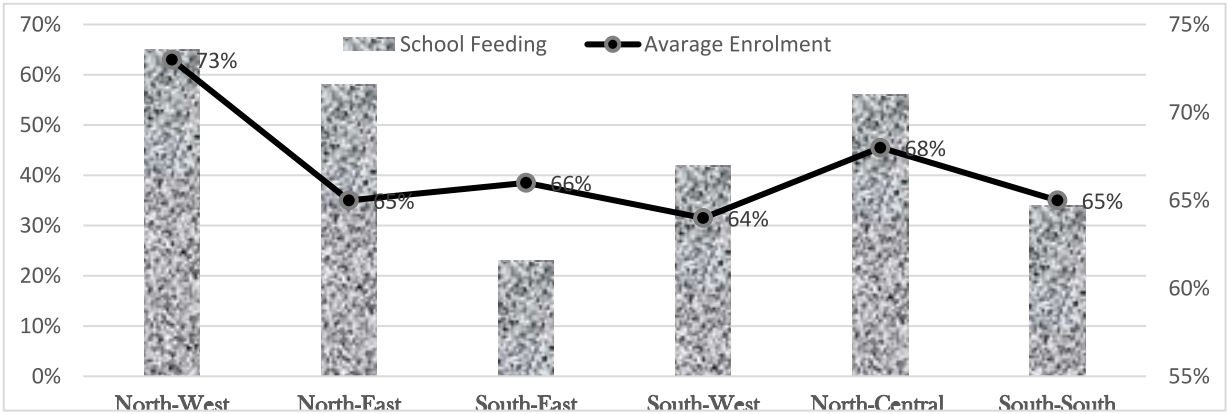

Figure 1. Percentage distribution of household's NHGSFP participation by regions in Nigeria.

Source: Author's compilation based on field survey

Analysis (Figure 1) showed that while North-West region and North-East regions recorded highest participant households in the NHGSFP, South East has the least participants followed by South-South region. Also on average enrolment of pupils, North-West recorded 73% on the average for boys and girls. North-Central recorded 68%, and North-East, 65%. If we take the average, it could be said that, the northern part of the country recorded 68% enrolment on average, while the southern part recorded 65%. This shows that both North and South Nigeria have done very well; however, a closer look at what was before the NHGSFP shows that the South used to have average 76% enrolment, while the north used to have average of 48%. On this note, if this current development should be attributed to the NHGSFP entirely, we can say that while it is helping enrolment in the North, it is as well demotivating enrolment in the South. This left a lot to be desired as South is the region that is known to have more penchants to schooling especially the South- East. However, this may be explained by the fact that most government intervention programmes have not always been successful in the South-East region of the country (Uduji and Okolo-Obasi, 2019a, 2019b, 2019c, 2021).

Table 3. Distribution of respondent according to reasons for no participating in NHGSFP.

Reasons	N/E	N/C	N/W	S/E	S/S	S/W	Average
Not by choice	9	14	5	12	15	15	12
Does not belong to ruling party	8	16	6	41	38	22	22
Our politicians hijacked ours	25	37	31	31	36	40	33
That is not our need	14	10	15	14	8	16	13
We did not allow it	44	23	43	2	3	7	20

Source: Author's compilation based on field survey

A further probe (Table 3) into why many households have not participated in the programme shows that about 12% of the household heads assent that participation is not by choice, while 22% (mostly from the South) concede that it is because they do not belong to the ruling political party. Another 33% of the respondents conform that the politicians from their zones hijacked the fund mapped for NHGSFP in their own zone. Other are those who consent that school feeding is not their challenge (13%) and 20% who by themselves did not allow it in their communities. In spite of these key challenges that hinder full participation in NHGSFP in some parts of the country, World Bank (2013) concede in that Home Grown School Feeding Programme can make significant contributions to improving the health and education status of school children, stimulate job creation and boost the local economy. WFP (2021) also concur in that there is need for a purposeful engagement and support from all stakeholders to ensure the success of any HGSFP initiative.

Table 4. Percentage distribution of respondents by challenges faced in sending children and wards to basic school in Nigeria.

Challenges	N/E	S/E	N/W	S/W	N/C	S/S	Average
Cost of school uniform and learning materials	9	9	15	8	14	15	12
Against the tenet of my religious belief	12	1	16	8	16	5	10
Cannot afford to feed all well	38	14	41	18	37	16	27
Need their helping hand at work	24	18	15	10	22	9	16
Have to go to the cities for a better life	9	26	5	20	4	21	14
Need to make money early in life	2	23	7	19	3	22	13
Peers are doing better in the cities outside school	6	9	1	17	4	12	8

The analysis (Table 4) shows that, while the cost of school uniform and other leaning materials accounts for 12% of the reason why many are not in school, 10%, believe going to school is against the tenet of their religious believe. Bulk of those who believe is against their religion and those who need the children's help at work are from the North regions. Also majority of those who cannot afford to feed the children well are from the North regions, with NE 38%, NW, 41% and NC, 37%. This may explain while forced and child labour is higher in the Northern region compared to the Southern regions. On the other hand, those that their children migrate to the cities for greener pasture are in the South with, 26% in the SE, 20% in SW and 21% in SS. Also those that need the children to make money early in life and those that compare the children with peers outside school are more in the South. This also may be an explanation to why child trafficking is more pronounced in the South.

4.2 Econometric analysis

Analysis (Table 4) summarized the average differences in the basic scores and independent observable characteristics between recipients and non- recipients.

Table 5. Comparison of mean score and observable characteristics across participants and non-participants in NHGSFP in Nigeria (N =2400)

Score in Percentage of maximum score	Treatment	Control	Difference
Score on increase in basic education enrolment	42.34	31.29	11.05**
Score on reduction in forced child labour	21.32	34.39	-13.07**
Score on improvement of nutrition and health	37.41	29.42	7.99**
Score on reduction in child trafficking incidence	22.73	39.34	-16.61**
Socio-Economic Characteristics household head			
Age	25.44	24.35	1.09
Sex	13.25	12.85	0.4
Education	22.43	23.17	-0.74
Marital Status	19.19	18.81	0.38

Household Size	11.18	11.71	-0.53
Primary Occupation	25.12	24.81	0.31
Annual Income	52.16	53.63	-1.47
Observation	**1200**	**1200**	

**= significant at 1% level

Source: Authors' compilation based on household survey

Matching treatment and control we noted the difference in means which shows that the score on increase in basic education enrolment, score on reduction in forced child labour, score on increased wellness and good health, and reduction in child trafficking incidence are reasonably significant and high for the households that are participating in the NHGSFP compared to the control group. The differences are 11.05, an increase, (13.07) a decrease, 7.99, an increase and (16.61) a decrease respectively in all the categories measured. This shows that the treatment actually has triggered enrolment, decreased child and forced labour, improved the nutrition and health of the pupil and has decreased the incidence of child trafficking.

While the study disagrees with the assertions of Adekunle & Christiana (2016), Taylor & Ogbogu (2016), in their respective studies of one State, (Osun state in Nigeria) suggest that school feeding has not shown any significant impact on school enrolment. This, gives credence to Alabade *et al* (2020) who studied only one local government in Lagos State with a conclusion that the school feeding programme has more impact on attendance than on academic achievement of pupils. The study also buttress the findings of Simeon (1998) in Jamaica, and Atta & Manu (2015) in Ghana, in that both studies suggest school feeding programme as a panacea to children school dropout and surge of children in street situation. This is because the study established the ripple effect of the NHGSFP in reducing street children by increasing basic school enrolment, thereby lowering the incidence of child labour and child trafficking.

4.3 Robustness test

In line with the probability of participating in the NHGSFP predicted in the model, we estimated the impact of participating on household by the average treatment effect (ATT). The observations we carefully certified are ordered randomly and there are no large disparities in the distribution of propensity scores. To this, we took note of the fact that the NNM nearest neighbour matching (NNM) is the matching that produced the highest and most significant treatment effect as estimated in line with all the four outcome categories.

Table 6. Estimated impacts of participating in NHGSFP on School enrolment via different matching algorithms

	Access and Knowledge Score in Percentage of Maximum Score		**Average Treatment effect on the treated**
	Receivers	Non- Receivers	
Nearest neighbour matching	Using single nearest or closest neighbour		
Score on increase in basic school enrolment	42.34	31.29	11.05**
Score on reduction in forced child labour	21.32	34.39	-13.07**
Score on improvement of nutrition and health	37.41	29.42	7.99**
Score on reduction in child trafficking incidence	22.73	39.34	-16.61**
Observations	**1200**	**1200**	
Radius matching	Using all neighbours within a caliper of 0.01		
Score on increase in basic enrolment	25.41	16.27	9.14**
Score on reduction in forced child labour	23.34	29.18	-5.84**
Score on improvement of nutrition and health	28.31	23.51	4.8**
Score on reduction in child trafficking incidence	16.23	22.31	-6.08**
Observations	**1200**	**1200**	
Kernel-based matching	Using a bi-weight kernel function and a smoothing parameter of 0.06		
Score on increase in basic enrolment	26.32	19.42	6.90**
Score on reduction in forced child labour	42.36	53.69	-11.33**
Score on improvement of nutrition and health	43.21	36.32	6.04**
Score on reduction in child trafficking incidence	15.21	18.43	-3.22**
	1200	**1200**	

**= significant at 1% level

Source: Authors' compilation based on household survey.

Analysis (Table 6) shows that the nearest neighbour matching estimate of the increase in school enrolment due to participating in NHGSFP is approximately 13%. This shows that 13% of the growth in enrolment is explained by NHGSFP. However, we tried the other two matching method to see if the match could be better than that of the NNM. The result shows that the estimated impact using Kernel-based matching algorithm produces about 9% while that of radius matching algorithm is approximately 7%. The implication here is that even though the other two method produced lower scores, in all, the outputs confirmed that, the programme NHGSFP, has generated significant gains in increasing school enrolment, reducing child labour, improving

children's nutrition and health as well as reducing trafficking incidence in rural communities in Nigeria. Similarly, our finding is cohering with Atta and Manu (2015) on Ghana school feeding programme in that they are viewed as a way to help boost enrolment, encourage better attendance, improve the ability of children to learn and close the gender gap in schooling.

On the whole, our findings support the programme theory of intervention (Masset and Gelli, 2013; Gelli *et al,* 2016) with evidence, in that the cost of school feeding programmes, which can actually double the cost of educating a child, should be viewed in the context of how it helps rural children by reducing their hunger, and motivate them to come to school and be fed, to concentrate and complete their elementary education programme. However, in extension and contribution, this paper suggests that HGSF creates several opportunities for rural dwellers in sub-Saharan Africa, such as: boost rural equal access to education, boost rural enterprise and economies, enhance agricultural productivity, food security and nutritious food and job creation; discourages trafficking of children from rural communities to cities for exploitative domestic work, prostitution, street trading, and the work of bus conductors. It is our contention that policy makers and development organizations should embrace school feeding programmes as a way to help poor children get enough to eat while giving them an incentive to be in school. This, in turn, will reduce the incidents of child labour, forced labour and child trafficking in rural communities of sub-Saharan Africa.

5. Conclusion, policy recommendation and future research direction

The National Home Grown School Feeding Programme (NHGSFP) is a government led ₦70 per day school feeding programme that aims to improve the health and educational outcomes of public primary school pupils. It uses locally grown farm produce by smallholder farmers to provide children nutritious mid-day meals on every school day. NHGSFP connects local farmers to the education sector by facilitating their access to the school feeding market. Thus, we set out to investigate the impact of the NHGSFP on rural communities in Nigeria. The research builds on the scant scholarly evidence on the relevance of the NHGSFP in Nigeria. In modeling the impact of NHGSFP on rural communities in Nigeria, we used inferential statistics which combined both propensity score matching (PSM) and logit model to test the hypothesis that school feeding programmes help children in rural Nigeria. Two thousand four hundred households were sampled across the six geopolitical zones of Nigeria. The results from the use of a combined propensity score matching and logit model indicate that NHGSFP makes significant contributions to improving the health and educational status of rural school children, stimulate job creation and boost rural economy. This implies that a well-designed and integrated home grown school feeding programme can make significant contributions in improving food security at the household level, spurring job creation and boosting agricultural markets. The findings suggest the need for a purposeful engagement and support for all stakeholders to ensure the success of home grown school feeding programmes.

The policy implications in terms of practice, policy and research are discussed in what follows. From the perspective of practice, it is obvious from the results that improved health and educational status of rural school children, job creation and rural economy can be stimulated through the government's NHGSFP. The relevance of the study is premised on the importance of how school feeding programme can be leveraged by policy makers in order to provide an interface of children's school attendance between the government of Nigeria and farmer's agricultural productivity in rural community. The underlying consolidation can be made through a well-designed and integrated home grown school feeding that is focused on improving the health and educational status of rural school children, food security at household levels, job creation and agricultural markets. However, the main caveat of the study is that it is limited to the scope of Nigeria. Hence, the findings cannot be generalized to other developing countries with the same policy challenges. In the light of this shortcoming, replicating the analysis especially, in other sub-Saharan African countries is worthwhile in order to examine whether the established nexuses withstand empirical scrutiny in different contexts of Africa.

Disclosure statement

No potential conflict of interest was reported by the authors.

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