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## Gender and Food Security in Nigeria: the Role of Corporate Social Responsibility in the Oil Producing Communities

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# A G D I Working Paper

WP/23/039

## **Gender and Food Security in Nigeria: the Role of Corporate Social Responsibility in the Oil Producing Communities**

Forthcoming: Journal of Global Responsibility

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**Gender and Food Security in Nigeria: the Role of Corporate Social Responsibility in the Oil Producing Communities****Joseph I. Uduji & Elda N. Okolo-Obasi****Abstract**

The purpose of this paper is to critically examine the multinational oil companies' (MOCs) corporate social responsibility (CSR) initiatives in Nigeria. Its special focus is to investigate the impact of the global memorandum of understanding (GMoU) on gender and food security in the Niger Delta region of Nigeria. This paper adopts a survey research technique aimed at gathering information from a representative sample of the population. A total of 800 women respondents were sampled across the rural areas of the Niger Delta region. It is essentially cross-sectional: describing and interpreting the current situation. The results from the use of a combined propensity score matching (PSM) and logit model indicate that CSR interventions of the MOCs using GMoUs have contributed in empowering women to effectively discharge their role in food and nutritional security. This is achieved by enhancing coherence in policies on gender, agriculture, nutrition, health, trade and other relevant areas in the Niger Delta. The findings also show that CSR intervention of MOCs supported ecological sound approaches to food production, such as agro-ecology that promotes sustainable farming and women's empowerment in the region. This suggests that recognizing and respecting the local knowledge of farmers, including women farmers, will help develop locally relevant food and nutrition security in sub-Saharan Africa. This implies that promoting the implementation of everybody's right to food, particular that of women, as well as giving women rights to other resources like land, in addition to engaging women and men in challenging the inequitable distribution of food within the household will help strengthen food security in Africa. This research contributes to the gender debate in agriculture from a CSR perspective in developing countries and serves as a basis for the host communities to demand for social projects. It concludes that corporate establishments have an obligation to help in solving problems of public concern.

*Keywords:* Gender, food security, corporate social responsibility, multinational oil companies, sub-Saharan Africa

## **1. Introduction**

Food security, at all levels (individual, household, national, regional, and global) is realised when all people, at all times, have an all-round access to adequate, harmless as well as nourishing food to meet their dietary needs and nutrients preferences for healthy living (FAO, 1996). Food insecurity, on the other hand, is a political cum economic phenomenon driven by unbalanced global and national practices. In addition, it is an environmental problem. More and more unmanageable methods of intensive agriculture, fishing and livestock farming are occasioning air pollution as well as food and water erosion, which are backing change in climate and food insecurity (FAO, 2014). Most significantly, food insecurity is gender disparity issue: low standing and lack of access to resources simply imply that women and girls are the most deprived by the unbalanced global economy processes that administer food systems (FAO, 2013). Rural men have a habit of controlling assets and making vital decisions as it concerns the use of assets such as land, revenue or technology for food production. Rural women, on the other hand, generally work in the private sphere as suppliers of meals and careers of household welfare; their productive cum economic duties tend not to be valued or even supported. They are, in addition, constrained in the choices they are allowed to make in accessing assets as well as services for food and nutrition security (FAO, 2011). This process of limitation can either grow or drop over time, depending on an array of factors, such as age, religious belief, location, wealth, position in a family, and marital status. It shoots out from unfair social norms that permeate all levels of society and that place a lower value on a woman or girl than on a man or boy (FAO, 2009). In the face of often restricted access to either local or global markets, women institute the majority of food producers in the world and usually handle the needs of the family. They accomplish this despite deep-rooted gender disparities and increasing precariousness of food prices. With all they put in, regrettably their personal food security and dietary needs as well as those of their daughters are being abandoned at the household (family) level, where prejudiced social cum cultural norms triumph (FAO, 2007).

Roughly about one-third of the deprived in the world live in Africa; and of late, indications show that discrimination may indeed be a more substantial problem in Africa than in other expanses of the evolving world (African Development Report, 2015). Africa is one of the fastest rising expanses in the last decades, yet, high levels of impoverishment and unfairness persist in Africa. To be more elaborate, six of the world's ten fastest developing economies during 2001-2010

were in sub-Saharan Africa (African Economic Outlook, 2017). Precisely, the fastest growing economies in Africa in the decade (2001-2010) were Angola, then Nigeria, followed by Ethiopia, Chad, Mozambique, Rwanda and Equatorial Guinea (African Competitiveness Report, 2017). The economy of Nigeria, without doubt, depends heavily on the oil and gas sector, which provides 95% of the export proceeds, 80 to 85% of the government incomes, and about 32% of gross domestic products-GDP (African Development Report, 2015). Nigeria is the leading oil producer in Africa and among the top ten worldwide; its recoverable reserves were assessed at 36.2 billion barrels in January 2007 (African Economic Outlook, 2017). In spite of the country's relative oil wealth, GDP per capita is 2,400 USD, and impoverishment is widespread — about half of the populace live on less than \$1.25 per day (African Competitiveness Report, 2017). The Niger Delta region of Nigeria where multinational oil companies (MOCs) hold a significant presence in the nation is marked by lack and underdevelopment. Oil extraction, being a capital rather than labour-intensive industry, provides little employment opportunity (NDDC, 2001). The state of the region is worsened by the challenging geographical terrain which makes infrastructure more expensive, and by the consequences of environmental degradation, caused to an extent by oil extraction – gas flaring and oil spillage -on traditional industries such as agriculture and fisheries (UNDP, 2006). Traditionally, the people of the Niger Delta operate more as farmers and fishermen, but the problems from oil extraction activities as well as fast growing population, has resulted in these traditional lines of occupation being either no longer viable or having experienced noticeable decline; as a result, the region's rate of joblessness is higher than the national average (NDDC, 2004; Francis *et al*, 2011).

Meanwhile, MOCs participate in a plethora of corporate social responsibility (CSR) activities in the Niger Delta as well as other parts of Nigeria (Okolo-Obasi *et al*, 2021; Edoho, 2008). Yearly, MOCs put in money in social projects and programmes in communities chiefly in the Niger Delta. The initial investments were centred on agricultural development programmes (early sixties) and have grown over the years to cover other areas like healthcare, small businesses and learning (education), which are beneficial to the host communities (Aaron, 2012). Over the years, MOCs have upgraded their engagement with local communities to provide these projects. In 2006, MOCs brought into functioning a new way of relating with communities called the global memorandum of understanding (GMoU). The GMoUs stands for an essential shift in CSR approach of the MOCs, emphasizing on a clearer and more accountable processes,

communicating frequently with the grassroots, sustainability and prevention of conflict (SPDC, 2013). Under the agreement of the GMoUs, the communities make their choice of the sort of development they want while MOCs provide secure funding for five years; thereby ensuring that the communities have steady and reliable funding as they carry out the execution of their community development plan (Chevron, 2014). This system takes the place of the previous line of attack whereby MOC had agreement with individual communities and handled them directly and distinctly (Ekhaton, 2014). Remarkably, by the end of 2012, MOCs have signed agreements with as much as 33 GMoU clusters, with about 349 communities thus covered (Uduji *et al*, 2021). That is about 35% of the local communities around the business operations of the MOCs in the Niger Delta (SPDC, 2018; Chevron, 2017). However, the degree of the contribution of the CSR initiatives of MOCs in the development of communities in the region remains disputed (Asongu *et al*, 2019). For example, Akpan (2006) has disputed that the CSR initiatives of MOC have failed to add to the community development and have, in some instances, even ended up causing inter-community and intra-community conflicts. Contradicting that view, Ite (2007) suggested that the CSR initiatives of the MOCs have in point of fact contributed in the development of the communities in the region, putting the level of governmental failure into consideration; and that MOCs have continually worked on their CSR strategies so as to better react to the needs of their host communities. Yet, Lompo and Trani (2013) recently added some shade to the debate as they proposed that the CSR initiative of MOCs have assisted in assessing basic capabilities like water, electricity and shelter, but have also, at the same time, weakened human development. Similarly, Renouard and Lado (2012) put into account that the CSR activities of MOCs have somewhat assisted to the advancement of the material security of some of the people living in proximity to oil production sites, but disparities or relational capabilities have obviously worsened situations in these communities.

Ensuing from the preceding opposing outlook of the CSR initiatives in the Niger Delta, this paper is a plus to gender discourse in agriculture and comprehensive growth literature from the CSR standpoint, by looking at the empirical fact in four areas that have been notably considered in the literature. The paper seeks establishing the level of CSR investment that the MOCs have given themselves to in the area of food security as well as ascertaining the extent of gain from such investment that accumulate for the rural women and how it impacts on their trade. These four areas of interest, in the same light, stands for four main questions, notably:

- What is the strength of MOCs' investment towards achieving food security in the Niger Delta region of Nigeria?
- What is the level of involvement of the existing gender in the GMoU activities of the MOCs in the host communities?
- Do GMoU interventions of MOCs' initiate positive changes on the role of rural women in line with the four key components of food security-food handiness, food access, food use, and food solidity – in the Niger Delta region of Nigeria?
- Do MOCs' GMoU interventions positively influence on the role of women in food and nutritional security in the Niger Delta region of Nigeria?

### 1.1 Study hypothesis

Traditionally, people indigenous to Niger Delta are farmers and fishermen. Women are essential in the conversion of the farm yield into food and dietetic security for their families (household). They are usually the farmers who cultivate foodstuff and engage in commercial crops production alongside the men in their families as a source of revenue (Uduji and Okolo-Obasi, 2022a, 2022b, 2022c). When women earn money, substantial evidence show that the earnings is more likely to be spent on food and the needs of the children (Okolo-Obasi *et al*, 2021). Women are generally responsible for food selection cum preparation and for the care cum feeding of children. Despite often limited access to either local or global markets, they constitute the majority of food producers in the region and usually manage their families' nutritional needs. They achieve this despite entrenched gendered inequalities and increasing volatility of food prices. Yet, their own food security and nutrition needs – and often those of their daughters – are being neglected at the household levels, where discriminatory social and cultural norms prevail. Thus, we hypothesize as follows:

- CSR of MOCs utilizing GMoU has failed to substantially aid the development of rural women's involvement in the four pillars of food security -- food handiness, food access, food use, and food solidity – in the Niger Delta region of Nigeria.
- CSR of MOCs utilizing GMoU has no substantial impact on the role of women in food and dietary security in the Niger Delta region of Nigeria.

Based on the aforementioned, the main aim of this research is to ascertain the level of CSR investments of MOCs in food security, and how such action impacts on source of revenue of rural women in host communities. The paper adds to the inequality discussion in food security and inclusive growth literature from the CSR outlook. The study made use of quantitative approach and applied survey technique. The ground of shooting out of this research departs from modern-day gender and food security literature, which has concentrated on, *inter alia*: breaking ground: gender and food security, food and agriculture organization (FAO, 2005); policy on gender equality and women's empowerment (IFAD, 2012); proceedings of the consultation on strengthening women's control of access for better development outcomes (IFPRI, 2007); the challenges of hunger: building resilience to achieve food nutrition and security (IFPRI, 2013); food security and the right to food in the discourse of the United Nations (Mechlem, 2004); the need to adopt non-policy measures in aid of the implementation of sex discrimination laws in Nigeria (Okongwu, 2020); gender equality in agriculture: what are really the benefits for sub-Saharan Africa (Adamon and Adeleke, 2016); gender discrimination in land ownership and the alleviation of women's poverty in Nigeria: a call for new equities (Ajala, 2017); linkages between poverty reduction strategies and child nutrition: an Asian perspective (Alderman, 2005); the state of food insecurity in the world: economic is necessary but not sufficient to accelerate reduction of hunger and malnutrition (FAO, 2012); access to justice for Nigeria women: A veritable tool to achieving development (Olusegun and Oyelade, 2021); gender assessment in the Niger Delta region of Nigeria (PIND, 2011); gender and economic growth in Kenya (World Bank, 2007); gender dimensions of the right to food (Rae, 2006); gender policy promoting gender equality and empowerment of women in addressing food and nutrition challenges (WFP, 2009); women, health and development (WHO, 1985), and gender in agriculture sourcebook (World Bank, 2009).

The rest of the paper is arranged in the following way: brief examination of the literature and theoretical underpinnings (section 2); description of the materials and method (section 3); presentation of the results and corresponding discussion (section 4), and conclusion with policy implications, caveats and future research directions (section 5).



## **2. Literature and theoretical underpinnings**

### **2.1 Literature**

Food security is a developing and flexible concept with more than 200 definitions in published documents. However, for this study, we put to life the definition developed at the 1996 world food summit and used extensively by UN organization. It states that food security is attained when all people, at all time, have bodily(physical) and economic access to adequate, healthy as well as nourishing food to meet their dietary needs cum food preferences for healthy living (FAO, 1996). The report of this 1996 world food summit also denotes the four pillars of food security which are recognised as the constituent of food security during the 2009 world summit on food security (FAO, 2009). The constituents of these four pillars are analysed as follows. First is availability of food, from both domestic production and/or imports, and for such food to be regularly available to individuals within their reach or within realistic contiguity; it also includes a satisfactory level of supply from either the capacity to produce the total amount of food needed by the population or having the resources to purchase such (food) when necessary (FAO, 2001). In this case, women are vital players in the farming sector, and their duties in agricultural self-employment is distinguished in sub-Saharan Africa, where women's duty in food production within agriculture is even greater as they are responsible for supplying most of the labour required to produce food crops. In addition, they usually control the utilization or sale of food produce grown on plots they are in charge of (IFAD, 2012). The second is access to food, where each family (household) should have bodily (physical), social and economic access to sufficient food to meet her needs; which means that each family must have the knowledge and aptitude to produce or procure the food that it requires on a sustainable basis (FAO, 2007).Nevertheless, having access to food can be limited physically by wash-out roads in a rainy season which can be responsible for cutting off access to the nearby village market; thus, economic access to markets is an essential factor in food insecurity (WFP, 2009). Third is food utilization, which refers to the using of food to meet the precise dietary and nutritive needs of individuals; it also comprises proper food treating (processing) and storage techniques, as well as satisfactory health and hygiene (sanitary) services (FAO, 2005). Yet, having access to food of satisfactory quality does not spontaneously translate into good nutritional status for individuals. Women's duty in food utilisation for food security is possibly the most needful, outweighing the relevance of their duty in food production and how they expend the earnings they get. Women are typically in authority

for food preparation and thus are central to the dietary variety of their family (household); they are also generally liable to choosing from food procured to complement staple foods and to stabilize the diet of the family (IFPRI, 2007). Fourth is food stability, where a reasonable degree of steadiness in the food supply from one year to the next and during the year is certain; which also implies having sufficient food capacities or other means of savings for times of failure of crops and other crises (FAO, 2011). Hence, these pillars allow for a more wide-ranging examination of the complex dimensions of food security, but they are deficient in comprehensive gender focus, a sensitive point of concern in this work. This study is envisioned to inform policy, practice and research so that they assist in the achievement of gender-just food and dietary security.

## **2.2 Theoretical underpinnings**

### **2.2.1 The liberal feminist theory**

According to African Economic Outlook (2017), Nigeria, as it were, has the highest number of women entrepreneurs in the whole world. Out of the over 41 million small and medium enterprises (SMEs), women make up 40% of the number. This high level of women's involvement in entrepreneurship has been found out to be driven by need. It is an existing global evaluation that nine out of ten start-ups collapse and die within three years. This, therefore, requires accelerators programmes to avoid such untimely deaths. With that in mind, it is worth noting that many women entrepreneurs in Nigeria are functioning below their ability. This is ascribed to prejudiced practices, low productivity, lack of access to resources, and limited entrepreneurships as well as leadership skills (African Development Report, 2015). Other issues include insufficient training, lack of information, inadequate management experience, insufficient infrastructural development, absence of strategies to develop financial literacy, restricted access to external loans for business sustainability, and poor support from family. As a result, women entrepreneurs in Nigeria suffer business failure, premature (early) exit, stagnant growth, and poor (low) return on investment (African Competitiveness Report, 2017). However, in explaining the systematic variances why female entrepreneurs adopt an abridged growth intention and a smaller size of business, we made use of the liberal feminist theoretical viewpoints. The liberal feminist theory, from the view of Fischer *et al* (1993), asserted that the

liberal feminist tradition goes back to the very beginning of feminism and argues for the requirement of social reform so that women are made to enjoy the same status and openings as men. The central basis of the liberal theory undertakes that men and women are equal and that judiciousness, not sex is the foundation for individual rights. It accentuates the presence of unfair barriers and organised biases facing women (some examples are regulated access to resources, education, business experience), which must be jettisoned. Liberal feminism is an extension of political views of parity, entitlement, and individual rights. The liberal feminist standpoint has been the grounds for several legal changes that have created room for greater equality for women (Unger and Crawford, 1992). Liberal feminist theory in the line of thought of this study as it concerns women's duty in food and dietetic security postulates that if women were given equal access to the openings available to men such as learning, work experience, and other resources, they would respond similarly.

### **2.2.2 African conceptualization of CSR**

Most research on CSR in developing countries has either generalised about all developing countries, or focused at national, rather than regional level (Ali, 2022; Aqif and Wahab, 2021; Ben and Ben, 2022; Bhatia and Makkar, 2020; Dartey-Baah and Amoako, 2021; and Diers-Lawson *et al*, 2020). In terms of generic literature, CSR is a useful compendium as special issues on corporate citizenship have appeared in literature (Ebaid, 2022; Fleming and Jones, 2013; Frynas, 2005; and Ikram *et al*, 2020). Although the literature often frames the debate about CSR in a global context, there is a very little empirical research on the nature and extent of CSR in developing countries (Ireland and Pillay, 2009; Ite, 2004; Joubert, 2020; Salamzadeh, 2020; Sheehy, 2014; Topic', 2021; and Topic' *et al*, 2021). Nevertheless, there is a deep argument that CSR in emerging nations is most directly shaped by the socio-economic situation in which firms work and the development priorities such generate (Idemudia, 2014; Slack, 2012; Eweje, 2006; Asgil, 2012; Marchant, 2014; Uduji *et al*, 2022).

Carroll's (1991) CSR pyramid is most likely the most recognized model of CSR, with its four levels showing the relative prominence of economic, legal, moral (ethical) and philanthropic duties correspondingly. Yet, the exploration of CSR in Africa was used to question the precision and significance of the Carroll's (1991) CSR pyramid. According to Visser (2006), accepting

Carroll's basic four-part model, suggests that the relative precedence of CSR in Africa are probably different from the classic, American ordering. Notwithstanding, it is also projected that Carroll's CSR pyramid may not be the best model for having a good grasp of CSR in general, and particularly CSR in Africa. Muthuri (2012), depending on the extant literature on CSR in Africa, postulated that the CSR issues dominant in Africa include poverty reduction, health and HIV/AIDS, environment, sports, human rights, community development, education and training, economic and enterprise development, corruption, and governance cum accountability. According to Frynas (2009), philanthropic activities as CSR by companies are widespread in Nigeria; thus, in emerging countries, the absence of government action in making available amenities for its citizens draws attention to the role of the multinationals in CSR and philanthropy, which is not considered as CSR in Western countries. Amaeshi *et al* (2006) have claimed that CSR in Nigeria is specifically directed at resolving the socio-economic development problems of the country, including reduction of poverty, healthcare provision, infrastructure improvement and learning (education). This, they argue, is in contrast to many Western CSR precedence such as protection of consumers, green marketing, fair trade, socially responsible investments, and climate change concerns. Thus, this research work adopts quantitative methodology but sees the result from the liberal feminist and African CSR outlooks.

### 3. Method and materials

In this research work, we adopted a quantitative method, given the scarcity of quantitative data on the convolutions of CSR bearing in the region (Uduji *et al*, 2021, 2022, 2023). This study made use of a survey research method aimed at procuring information from an illustrative sample of female farmers. It is in actual fact cross-sectional, defining and interpreting what exists at the moment. Figure 1 categorizes the component administrative states of the Niger Delta, Nigeria.



**Figure 1:** Constituent administrative states of the Niger Delta, Nigeria  
**Source:** NDDC, 2004

### **3.1 Sampling procedure**

In the main data collection, multi-staged sampling method was put to use to make the final choice of respondents. These phases include stratified, quota, purposive and simple random sampling. We stratified the nine states of the oil host communities in relation to the former nineteen states of the federal republic of Nigeria to safeguard homogeneity in sample selection. One strata is Akure strata, which has only Ondo as a state. Others are: Bendel strata, made up of Edo and Delta states; Calabar strata, which has Cross-river and Akwaibom states; Owerri strata, made up of Imo and Abia states, and, finally, Port strata, having Rivers and Bayelsa states. In the second phase, we used purposive sampling method to choose one state from each of the strata based on the existence of MOC facilities in the state. Hence we picked Ondo in the Akure strata as the only state in the strata. Delta was selected from the Bendel strata, Akwaibom picked from the Calabar strata, Abia from the Owerri strata and Rivers as the one selected from the Port strata. The third stage saw us also putting to use purposive sampling method to choose four local government areas (LGAs) from each of the selected state similarly on the basis of hosting MOC facilities. Thus, a total of twenty LGAs were considered. In the fourth stage, we purposefully chose two communities from each of the selected LGAs and the reason was to certify that one community picked must be a part of the cluster development board (CDB) while the other comes outside that circle. In the last stage, we involved the assistance of the community leaders to pick 400 respondents each from both the CDB communities and the non-CDB communities. Therefore, a total of eight hundred (800) respondents were put to use in the study (Table 1). Informed consent was an ethical imperative for this study. Hence, we made sure that all survey participants involved were fully informed about what the research questions were and how the data generated would be used. Participants were also assured that there would not be any consequences for participating in the survey. Before the survey, we explained and agreed with the community leaders on whom the researchers and the research assistant were, the intention of our study, what data we would be collecting from participants, and how the data would be used and reported, as well as the potential risk of participating in the research. Therefore, no

respondent or participant was forced or coerced into taking part in this study. Moreover, anonymity and confidentiality of the information was assured to the voluntary respondents.

**Table1:** Sample size distribution

Strata	States	Population	Population of Women	% of Total Population	Sate Sample	Treatment	Control
Akure	Ondo	4,671,695	2,382,564	17%	136	68	68
Bendel	Delta	5,663,362	2,888,315	21%	168	84	84
Calabar	<u>Akwalbom</u>	5,482,177	2,795,910	20%	160	80	80
Owerri	Abia	3,727,347	1,900,947	14%	120	60	60
Port	Rivers	7,303,924	3,725,001	27%	216	108	108
<b>Total</b>	<b>Total</b>	<b>26,848,505</b>	<b>13,692,737</b>	<b>100%</b>	<b>768</b>	<b>800</b>	<b>800</b>

**Source:** NDDC, 2001/ Authors' computation

### 3.2 Data collection

To distinguish the CDB respondents (treatment group) from the non-CDB respondents (the control group), structured questionnaire was administered to elicit vital information from the respondents. The questionnaire was divided into five sections with section one asking questions around the socio-economic and demographic characteristic of the respondents. Section two asked questions around strength of MOCs' investment towards achieving food security in the Niger Delta region while section three asked questions around the level of gender participation in the GMoU activities of the MOCs in the host communities. Furthermore, section four asked questions around positive changes on the role of rural women in line with the four key components of food security while section five asked questions around GMoU's positive influence on the role of women in food and nutritional security in the Niger Delta region.

We allotted cores to the questions in a form that stands fora suitable tool to assess qualitative issues by quantitative information. The questionnaires were administered directly by the researchers with the assistance of research aides due to the ensuing reasons. Firstly, the study area is made up of different ethnic groups and is multi-lingual with diverse local languages and dialects spoken. Secondly, the territories of the region is very rough with high level of conflicts. The aforementioned and a third reason which concerns some of the questions in the

questionnaire would need further explanation that could be best handled in the people's local dialects.

The secondary data utilized for the study were derived from the publications of the various MOCs community archives as well as other scholarly works done in the past. These data were utilized in trend analysis of food security and gender duties in the region.

### **3.3 Analytical framework**

The study examined the effect of corporate social responsibilities of the MOCs on rural women's involvement in food security in the Niger Delta with emphasis on availability of food, food access, food utilization and the stability of food. To accomplish the study intentions and test the hypothesis, both expressive (descriptive) and inferential statistics were used.

### **3.4 Econometric model**

The study made use of propensity score matching (PSM) and logit regression model to achieve objective 3 and 4. Our decision to use the combination of PSM and logit was informed by the need to tackle the problems of selectivity and endogeneity in the study. In adapting PMS for this study, we followed the instructions for applying propensity-score matching by Heinrich, *et al*(2010),to first take the respondents from communities with established cluster development boards (CDB) as the "treatment" in order to be able to estimate an average treatment effect of CSR of the MOCs using GMoUs. We then had an ideal assessment group from a larger survey which we matched to the "treatment" based on set of perceived characteristics. In addition, we were conscious of Caliendo and Kopeinig(2008) argument, in that propensity score matching estimates the effect of intervention on treatment based on covariates (variables) which could affect both the treatment as well as the control groups. The variables involved include those that informed the selection of the respondents, such as marital status, age of respondent, educational qualification etc that cannot be affected by the treatment. In the study, the choice to be treated (receiving CSR intervention), although not arbitrary, centres on the covariates observed. Therefore, to assess the impact of CSR on rural women's involvement in food security in the Niger Delta, the treatment group is represented as  $R_y = 1$  for woman<sub>y</sub> and  $R_y = 0$  for the control group. We, thereafter, followed the propensity score to match the treatment group to the control

group. This simply is the probability of receiving CSR as a result of some given observed characteristics.

For this reason, we have:  $P(X_y) = \text{Prob}(R_z = 1/X_z) (0 < P(X_z) < 1)$  Equation 1

Where  $X_z$  is a vector of the before CSR control covariates, if  $R_z$ 's are independent over all the  $Z$ s and the outcomes are independent of CSR of the MOCs using GMoU if  $X_z$  results are also independent of CSR given  $P(X_z)$  as it would if CSR are received arbitrarily. In drawing the precise deduction on the effect of the MOCs CSR activities on rural women's involvement in food security in the Niger Delta, we matched the probability of the treatment (covariates  $X$ ) by side-stepping the selection bias on observables. Hence, we specified the propensity score of Vector  $X$  as:

$P(X) = \text{Pr}(Z = 1/X)$ , Equation 2

In equation 2, the  $Z$  represents the treatment indicator which is equal to 1 if the selected rural woman belongs to the treatment group and has received direct CSR empowerment on rural women's involvement in food security. Then, zero if the rural woman belongs to the non-CDB group and have not received direct CSR empowerment. Because the propensity score is a balancing score, the observables  $X$  will be distributed similar for both the control and the treatment. The difference between the two is what is seen as to the effect of treatment on both the treatment and control.

In line with four steps from the literatures like, Uduji et al (2021), Okolo-obasi et al (2021), Okolo-Obasi and Uduji (2021, 2022, 2023), Heinrich *et al* (2010), Austin (2008), Caliendo and Kopeinig (2008), we adjusted the steps to get fair impact estimates. Knowing that the likelihood of receiving CSR is predicted by a binary response, we pulled two individual group (one treatment and one Control). With logit model of being treated or not being a function of some socio- economic characteristics covariates which consist of individual, household, and community covariates, we assessed the effects thus:



$$P(x)=Pr(Z=1/X)=F(\alpha_1x_1+\dots+\alpha_nx_n)=F(x\alpha)=e^{x\alpha} \quad \text{Equation 3}$$

From this, we got the value of the likelihood of being treated from the logit regression. Hence, we allotted each rural woman a propensity score. At the point, the rural women in the control group with very low (poor) propensity scores outside the range found for treatment group were dropped. For each woman in the treatment group, a rural woman in the control with closest PS was matched. These scores were measured by absolute variance in score referred to as nearest neighbour. This is why in the final analysis, we used the nearest five neighbours to ensure that rigorous process was followed. We calculated the mean values of the result of indicators for the nearest five neighbours and valued variance between control groups and treatment group as the average treatment effect on the treated (ATT).

The true ATT, based on PSM is written thus:

$$ATT_{PSM} = E_{P(x)} \{E(y_1/Z = 1, P(x)) - E(y_0/Z = 0, P(x))\}, \quad \text{Equation 4}$$

In the equation 4,  $E_{P(x)}$  represents expectation with respect to the distribution of propensity score in the population. The true ATT shows the mean difference in empowering the rural women. With this, we adequately matched each CDB rural woman with her counterpart provided they have similar observable characteristics.

### 3.5 SCOTDI

The MOCs working in the Niger Delta continue to face the issue of how to ascertain the success or failure of their CSR activities either as it relates to its effect on community advancement or its effect on corporate-community relations. To address this issue, MOCs in 2013 put into existence the Shell Community Transformation and Development Index (SCOTDI). It is a creative structure that combines and acclimatizes a number of international principles into a fused index such that it is receptive to local context (SPDC, 2013). The structure (framework) is used here to access and place in position the result of the divergent GMoUs clusters in the host communities of MOCs.

## 4. Results and Discussion

### 4.1 Descriptive analysis

We commenced the analyses of the respondents with description of some of their demographic (age, marital status, family size), economic (employment, estimated annual revenue, estimated per capita income of other family/household members) and social (highest educational qualification) features. These features are common among the treatment and the control; besides, they are very vital in understanding the variances in the socio-economic status of the women in treatment from those of the women in control.

**Table 2.** Socio-economic characteristics of the Niger Delta Women

Variables	Treatment Group			Control Group		
	Freq	%	Cum	Freq	%	Cum
<b>Primary Occupation</b>						
Fishing	48	12	12	58	15	15
Trading	134	34	46	66	17	31
Farming	152	38	84	170	43	74
Paid Employment	8	2	86	4	1	75
Handicraft	53	13	99	34	9	83
Unemployed	5	1	100	68	17	100
	<b>400</b>	<b>100</b>		<b>400</b>	<b>100</b>	
<b>Annual Income</b>						
1000 - 100,000	53	13	13	149	37	37
101,000 - 200,000	136	34	47	124	31	68
301,000 - 400,000	109	27	75	72	18	86
401,000 - 500,000	62	16	90	43	11	97
501,000 and above	40	10	100	12	3	100
	<b>400</b>	<b>100</b>		<b>400</b>	<b>100</b>	
<b>Age of Respondents</b>						
Less than 21 years	10	3	3	8	2	2
21 - 30 years	155	39	27	75	19	21
31 - 40 years	129	32	60	142	36	56
41 - 50 years	72	18	83	99	25	81
51 Years and Above	34	9	100	76	19	100
	<b>400</b>	<b>100</b>		<b>400</b>	<b>100</b>	
<b>Marital Status</b>						
Single	192	48	48	138	35	35
Married	128	32	80	210	53	87
Widow	23	6	86	20	5	92

Divorced/Separated	57	14	100	32	8	100
	<b>400</b>	<b>100</b>		<b>400</b>	<b>100</b>	
<b>Level of Education</b>						
None	27	7	7	56	14	14
FSLC	153	38	45	110	28	42
WAEC/WASSCE	122	31	76	171	43	84
Degree and Above	98	25	100	63	16	100
	<b>400</b>	<b>100</b>		<b>400</b>	<b>100</b>	
<b>Household Size</b>						
1-4 Person	248	62	62	236	59	59
5-9 Person	112	28	90	117	29	88
10-14 Person	22	6	96	36	9	97
15 Person and above	18	5	100	11	3	100
	<b>400</b>	<b>100</b>		<b>400</b>	<b>100</b>	

**Source:** Authors' compilation based on field survey.

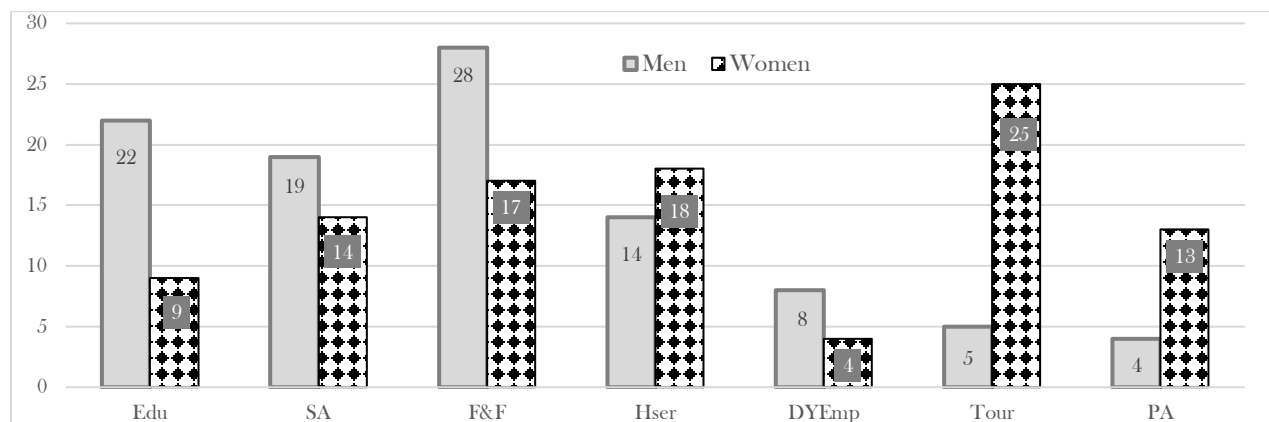
Analysis (Table 2) indicates that about 2% of the women in the treatment groups are engaged in paid employment while another 1% of the women are completely unemployed. In the control group, only about 1% are engaged in paid employment and another 17% are unemployed. In addition, about 38% of the women in the treatment group are into farming. Then, there are the following: 12% in fishing, 34% in trading and 13% into handicraft. On the other hand, while about 15% of the women in the control group are fishers, only 9% are involved in handicraft with 17% in trading and 43% in farming. This shows that a larger percentage (about 58%) of the women in the control are into traditional enterprises of fishing and farming in comparison to 50% (less percentage) of the women in the treatment. The analysis also reveals that the average age of the women in the treatment group is 32 years, while that of the control is 6 years more(38). About 7% of the women in the treatment group are stack illiterates, while about 14% of women in the control are in the same category. This shows that as much as 93% of the women in the treatment have at least basic education while for the control, it is 86%. The result gives consent to Lompo and Trani (2013) in that respondents in the treatment group have advantage in education over respondents in the control group; though, with a small margin. In addition, it simply reveals that basic education is not a major problem in the study area.

The examination also reveals that only about 10% of the respondents in treatment group make more than ₦500,000(\$1,000) yearly, while the control has about 3% that earn as much as that. In

the control group, 37% of the women make between ₦1000 to ₦100,000 (\$2 - \$200) annually while only about 13% of the women in the treatment also make as much as that.

#### 4.2 The intensity of MOCs’ CSR interventions in the Niger Delta region

We scrutinised the level of multinational oil companies’ general corporative social responsibility intervention in subdivisions in order to effectively answer the first research question. We looked at the intervention in such sectors as policy advocacy and dialogues, direct employment, education, health, skill acquisition, farming and fishing subsidies, soft loan as well as grant among others. The analysis (Figure 2) shows that the multinational oil companies have provided numerous CSR interventions using the GMoUs in various sector which directly affects the respondents in the treatment group. In such interventions, we put to record that the women have about 9% of it channelled towards education. In practical terms, it covers scholarship, bursaries, and oversea trainings granted to women of the area. In similar intervention towards men, we discovered that men enjoyed as much as about 22%. This shows that direct CRS intervention in education on men is 13% higher than that of women. From the examination, we also noted that men recorded about 19% in skill acquisition with women getting about 14%. In provision of subsidised farming and fishing inputs, men enjoyed 28% of the intervention, while the women got about 17%.

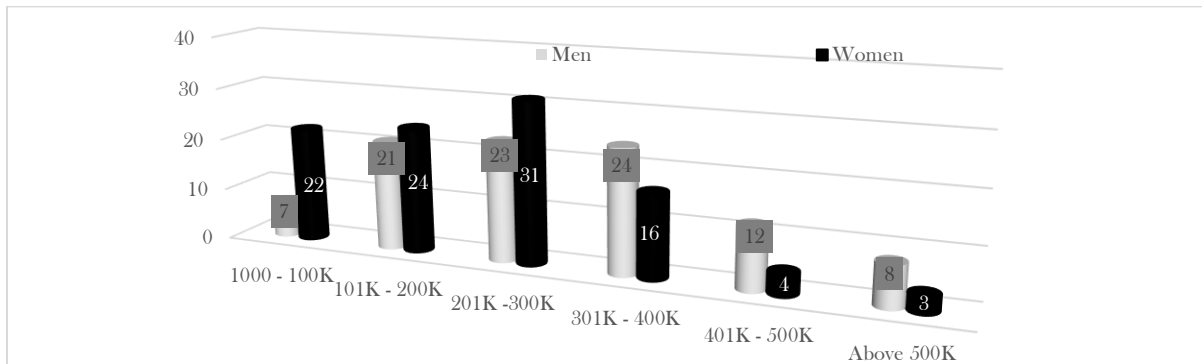


**Figure 2.** Percentage distribution MOCs’ CSR using GMoUs by sectors as received by men and women in the Niger Delta<sup>1</sup>.

**Source:** Authors’ compilation based on field survey.

<sup>1</sup>Edu – Education, SA –Skill Acquisition, F&F – Fishing/Farming, Hser–Health services, DYEmp –Direct Employment, Tour–Tourism, PA – Policy advocacy

The analysis (Figure 2) also reveals that as regard direct employment in the companies, 8% went to men while women got less(4%). In continuation, while women took 18% in healthcare provision and services, men recorded a lower percentage (14%). The women also enjoyed better in tourism development and empowerment intervention with 25%, while men received just5%. Another good area of intervention for women was policy advocacies and social dialogue (13%), men enjoyed just a paltry 4% because most advocacy sponsored were to favour the women.



**Figure 3.** Direct CSR intervention received from MOCs in the Niger Delta by gender.

**Source:** Authors’ compilation based on field survey.

Analysis (Figure 3) reveals the financial equivalent of CSR intervention receipt by the women in comparison to that received by men. The analysis shows that between ₦ 1,000 – ₦ 200,000 (\$2 - \$400) worth of CSR intervention have been enjoyed by about 46% of the women in one form or the other from the MOCs. About 28% of men, on the other hand, enjoyed similar treatment. Then, while about 8% of the men got above N500,000 (\$1000), only about 3% of the women have received same amount. Also, while only about 4% of the women have been given between ₦401,000 to ₦500,000 (\$802 -\$100), about 12% of the men got same range of amount. This indicates that on average, the CSR intervention enjoyed by men is much higher than that of the women. Nevertheless, the little extended to the women have made substantial impact in their role in achieving food security in the area. Yet, this implies that the level of impoverishment in the study area is still very high and devastating.

**Table 3.** Percentage rating of MOCs’ CSR in CSR intervention targeting women in Niger Delta.

Activities	Total E&P	Exxon Mobil	Chevron	Shell	Agip	Others	Average: Field Survey	Average: Data from MOCs	Diff.
Skill acquisition and business training	18%	23%	20%	23%	22%	23%	21.50%	22.70%	-1.20%
Enhancement of food transportation means	13%	11%	12%	14%	14%	14%	13.00%	14.30%	-1.30%
Advocacy visits to relevant stakeholder	9%	8%	11%	10%	9%	10%	9.50%	10.60%	-1.10%
Provision of subsidised Agric inputs for women	25%	22%	24%	16%	21%	20%	21.30%	22.80%	-1.50%
Provision of soft loans/grants targeting women	18%	18%	18%	19%	19%	17%	18.20%	19.20%	-1.00%
Provision food processing, preservation and storage facilities	17%	18%	15%	18%	15%	16%	16.50%	18.40%	-1.90%
	100%	100%	100%	100%	100%	100%			

**Source:** Authors' compilation based on field survey.

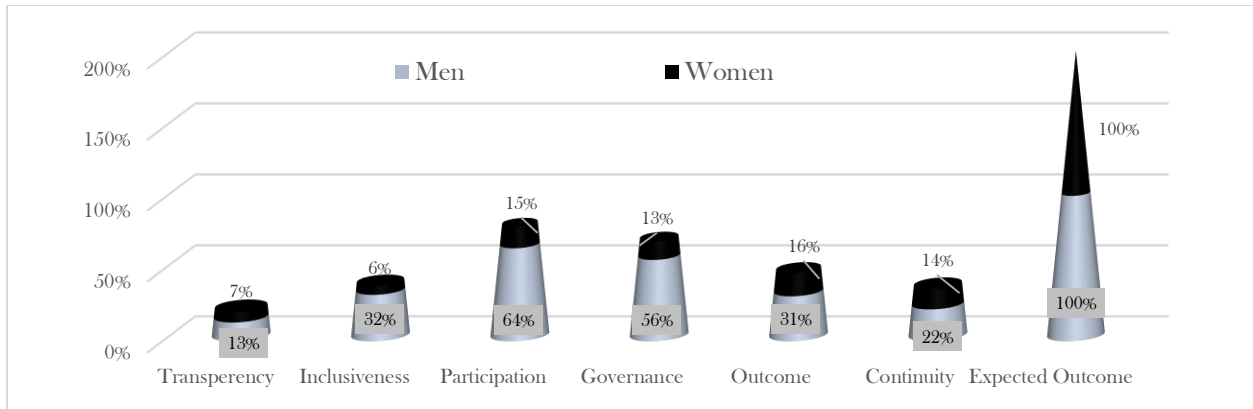
A critical look in the examination (Table 3) reveals the key efforts of MOCs' in improving women's assistance in achieving food security of the host communities in the Niger Delta Region. We looked at interventions in such areas as provision of food processing, skill acquisition and business training, enhancement of food transportation means, advocacy visits to relevant stakeholder, provision of subsidised agricultural inputs for women, provision of soft loans/grants targeting women, and preservation as well as storage facilities. The results show that making available subsidised agricultural inputs for women by the MOCs is about 21.3% of their intervention as against 22.80% estimated in the secondary data. Intervention as it concerns skill acquisition and business training got 21.50% boosting of means of food transportation took 13.00%, while advocacy visits to pertinent stakeholders to rouse women's involvement in food security accounted for 9.50%. All are against the data from the MOCs which are 22.70%, 14.30% and 10.60% respectively. These show a variance of -1.20%, -1.30%, and -1.10% respectively. Others are: provision of soft loans and grant that are directed at women only which accounted for 18.20% according to the women, and provision in line with food treatment (processing), conservation and storage facilities accounting for 16.50%. This reveals that, though the CSR activities by the MOCs mainstreaming gender is still at a poor (low) level, some

cautious significant efforts have been made by them in encouraging productivity, and food conservation by the women to better women's role in food security especially the rural women of the MOCs' host communities.

Also, in testing the second hypothesis of the study which states that CSR of MOCs utilizing GMoU has no substantial impact on the role of women in food and dietary security in the Niger Delta region of Nigeria, the study observed that the Wald criterion of CSR as a regressor was less than 0.05 at 0.042. Consequently, because our decision rule says to reject the null hypothesis if the associated p of the Z-Value, (the significance of the Wald criterion) is less than 0.05, we rejected the null hypothesis and concluded that, CSR of MOCs utilizing GMoU has no substantial impact on the role of women in food and dietary security in the Niger Delta region of Nigeria. This finding agrees with Renouard and Lado (2012) in that GMoU programmes did recognize the diversity of women's lived experiences, and women (as farmers or mothers) are usually targeted as a group for the necessities or susceptibilities. However, a holistic approach is hardly ever used to have a grasp of and address the many forms of unfairness and inequality that affect them in line with food security.

#### **4.3 Level of gender participation in the CSR intervention of the MOCs in the host communities**

In making effort to achieve the second objective of this study, which is to find out the level of gender involvement in the cluster development board as well as the level of access to the CSR intervention of the MOCs using GMoUs in the host communities, we made use of (but with some modification) the Shell community transformation and development index (SCOTDI). We used this SCOTDI to assess how the rural women felt as it concerns the following: involvement of women in governance of the CDB; women's inclusiveness in the CDBs' decision making; management openness of the CDBs; the result of the GMoUs in the region, and CDBs' continuity after MOCs' CSR activities. It was the perception of the women that was actually used to realise this as no other view can be used in place of theirs if anything is to be questioned or confirmed from the assertions of men and the secondary data from the MOCs.



**Figure 4** Gender involvement in CSR interventions in the Niger Delta Region

**Source:** Authors' compilation based on field survey.

From the SCOTDI framework examination (Figure 4), the women's rating of their participation in the CDBs as compared to that of men can be summarized thus: though the MOCs can be said to have made substantial CSR interventions in Niger Delta, their role in the intervention is still very poor when compared to men due to some cultural and socio-economic factors. Results of the examination of the principles in SCOTDI shows that in governance of the CDBs while the women rated their involvement at 13% they equally rated the men's involvement at 56%. This implies that the men very well dominated the governance of the structures that decides what area of CSR intervention to embark on. Generally, openness (transparency) is low in the women's rating, nevertheless, they rated themselves as being more transparent (13%) than men (7%). In the principle of inclusion, the women gave themselves a rating of 6% much lower than their rating of men's inclusion (32%). The implication is that they believe women are seriously left out in the decision making that affect their lives. Conversely, the inclusion rating shows that while about 94% of women were excluded, only a few men ended up hijacking the CDB management (excluding as much as about 68% of others). In general involvement in the CSR activities, the women believe their scorecard should be just 10% while that of men should be a very high 64%. This buttresses the supremacy of men and the need to mainstream gender in involvement and access to CSR activities of the MOCs using the GMoU programmes. This result concede to PIND (2011) in that these disparities are made worse by women cum girls' often limited room to productive resources, learning as well as decision-making by the burden of



unpaid work which was made normal (including care work), in addition to the endemic hitches of gender – based conflict (GBV), HIV and, by extension, AIDS.

#### **4.4 Econometric analysis**

In this examination (Table 4), we summarized the basic scores average variances and independent observable features between the treatment and the control. The variance in the estimates of food availability, access to food, food utilization and stability of food were proposed as presented in Tables 4 and 5. Table 4 indicates the marginal effects of logit estimations of food access, in column 2, while the standard error is in column 3. Food availability is accounted for in column 4 with the standard error in column 5. Column 6 and 7 outlined the marginal effect of food utilization, while column 8 and 9 reveals the marginal effects and standard error of stability of food. The coefficients of animal farming, crop farming, food treatment/preservation, literacy and access to credit are some of the variables that are positively significant. On the other hand, political affiliation, sex of respondents, age of respondents and household size are some variables that are negatively significant. The above puts forward that an increment in the size of agricultural venture can as well increase access to food by 6.2%, food availability 2.1%, and stability of food by 7.1%. It also reveals that a unit increment in crop farmers has 2.3% effect on accumulating access to food and 2.5% effect on stability of food.

**Table 4: Marginal effects of the determinants of access to food, food availability, food utilization, and food stability.**

Variables	Access to Food		Food Availability		Food Utilization		Food Stability	
	DY/DX	Std. Error	DY/DX	Std. Error	DY/DX	Std. Error	DY/DX	Std. Error
Small agric. venture	-0.062**	0.024	-0.082*	0.043	-0.021	0.062	-0.071**	0.061
Medium agric venture	0.018	0.065	0.041	0.051	0.018	0.038	0.025	0.032
Crop farming	0.023*	0.003	0.031	0.007	0.013	0.032	0.023	0.014
Animal farming	0.018*	0.008	0.023	0.041	0.012	0.022	0.034	0.017
Artisan	0.011	0.002	0.032	0.015	0.015	0.009	0.025	0.006
Fishing	0.076	0.014	0.014	0.012	0.023	0.014	0.034	0.010
Trading	0.056	0.021	0.025	0.029	0.025	0.032	0.053	0.002
Food processing/preservation	0.582*	0.002	0.524**	0.014	0.932*	0.032	0.061**	0.024
Transportation means	0.073***	0.013	0.061**	0.033	0.079**	0.031	0.082***	0.013
Location (urban)	0.008	0.018	0.018	0.032	0.024	0.021	0.042	0.018
Sex (Male)	-0.013	0.032	-0.025*	0.012	0.011	0.025	0.014	0.051
Age	-0.019	0.043	-0.043	0.033	-0.012	0.013	-0.015	0.031
Political affiliation (opposition)	-0.012	0.032	-0.025*	0.022	-0.006	0.005	-0.016	0.035
Education	0.063	0.016	0.061	0.022	0.017	0.021	0.018	0.031
Literacy	0.016*	0.042	0.023	0.036	0.019	0.016	0.015	0.019
Business nature (formalized)	0.021	0.041	0.121	0.001	0.011	0.021	0.051	0.024
Marital status	0.013	0.013	0.032	0.033	0.019	0.031	0.039	0.014
Household size	-0.125	0.010	-0.051	0.052	-0.015	0.035	-0.025	0.025
Primary occupation	0.031	0.003	0.034	0.033	0.034	0.023	0.048	0.034
Annual income	0.024	0.032	0.043	0.012	0.014	0.017	0.024	0.064
Credit access	0.421**	0.021	0.541**	0.028	0.082**	0.021	0.066**	0.013
N	800		800		800		800	
Pseudo R2	0.062		0.046		0.044		0.052	
Log likelihood	-417.312		-210.613		-351.256		-411.437	
Prediction	0.463		0.208		0.321		0.543	

\* = significant at 10% level, \*\* = significant at 5% level, \*\*\* = significant at 1% level.

**Source:** Authors' compilation based on field survey.

The consequence here is that the CSR should be aimed at reversing the trend in the variables that have lessening or negative impact on the factors of interest and boosting the variables that positively impact on the factors like access to food, obtainability (availability) of food, utilisation of food and food stability.

**Table 5.** Comparison of mean score and observable characteristics across Treatment and Control (N = 800)

<b>Score in Percentage of maximum score</b>	<b>Treatment</b>	<b>Control</b>	<b>Difference</b>
Score on access to food	30.30	26.26	4.04**
Score on food availability	27.61	24.13	3.48**
Score on food utilisation	21.25	19.45	1.80**
Score on food stability	23.54	17.36	6.18**
<b>Socio-Economic Characteristics</b>			
Age	21.41	15.21	6.20**
Education	21.33	19.12	2.21**
Marital status	23.16	23.41	-0.25*
Household size	13.50	16.65	-3.15**
Primary occupation	22.23	15.35	6.88**
Annual income	42.24	35.62	6.2**
Estimated per capita income of other household members	12.25	10.15	2.10**
<b>Observation</b>	<b>400</b>	<b>400</b>	

\* = significant at 10% level, \*\* = significant at 5% level, \*\*\* = significant at 1% level.

**Source:** Authors' compilation based on household survey.

From this examination (Table 5), we observed the variance in means of matching treatment and control. It reveals that the score on access to food, score on availability of food, scores on utilisation of food and score on food stability are all significantly higher for the women in the treatment group (that is, women that have accessed the MOCs' CSR interventions). The variance in mean are 4.04, 3.48, 1.80, and 6.18 respectively. On the part of the carefully chosen observable features, a closer examination shows that there are significant positive variances in age of the respondent =6.20; highest educational qualification of the respondents = 2.21; primary employment = 6.88; projected annual revenue of the respondents =6.2; and projected per capital earnings of other family (household) members = 2.10. On the other hand, we noted that the variance in means of marital status and family (household) size are negatively significant at (0.25) and (3.15) in that order.

Also, in testing the first hypothesis of the study, which states that CSR of MOCs utilizing GMoU has failed to substantially aid the development of rural women's involvement in the four pillars of food security -- food handiness, food access, food use, and food solidity – in the Niger Delta region of Nigeria, we noted that the Wald criterion of CSR as a regressor was less than 0.05 at 0.031. Therefore, because our decision rule says that if the associated p-value of the Z Value, (the significance of

the Wald criterion) is less than 0.05, the null hypothesis will be rejected, we rejected the null hypothesis and concluded that, CSR of MOCs utilizing GMoU has not failed to substantially aid the development of rural women’s involvement in the four pillars of food security -- food handiness, food access, food use, and food solidity – in the Niger Delta region of Nigeria. The implication here is that for the treatment group to have demonstrated gains in almost all the measurement indices, it means that the CSR interventions of the MOCs utilizing GMoUs could be seen as a facilitator in increasing the role of women in food security in the region in particular and the country (Nigeria) at large.

#### 4.5 Robustness test

In line with the likelihood of treatment as forecasted in the model, we evaluated the effect of treatment on women’s involvement in food security by the average treatment effect (ATT). The observations we cautiously certified are ordered arbitrarily and there are no large discrepancies in the allocation of propensity scores. Hence, we observed that the NNM (nearest neighbour matching) produces the highest and most significant treatment effect evaluation in all the four categories of result.

**Table 6.** Estimated impacts of treatment on women’s contribution to food security via different matching algorithms

	<b>Access and Knowledge Score in Percentage of Maximum Score</b>		<b>Average Treatment effect on the treated</b>
<b>Nearest neighbour matching</b>	Using single nearest or closest neighbour		
Score on access to food	35.30	26.26	9.04**
Score on food availability	27.61	24.13	3.48**
Score on food utilisation	21.25	19.45	1.80**
Score on food stability	23.54	17.36	6.18**
<b>Observations</b>	<b>315</b>	<b>315</b>	
<b>Radius matching</b>	Using all neighbours within a caliper of 0.01		
Score on access to food	26.37	24.26	2.11**
Score on food availability	22.61	20.18	2.43**
Score on food utilisation	18.15	16.25	1.90**
Score on food stability	18.54	14.36	4.18**
<b>Observations</b>	<b>378</b>	<b>390</b>	
<b>Kernel-based matching</b>	Using a bi-weight kernel function and a smoothing parameter of 0.06		
Score on access to food	19.35	16.26	3.09**

Score on food availability	15.16	13.13	2.03**
Score on food utilisation	22.52	21.41	1.11**
Score on food stability	21.14	18.36	2.78**
<b>Observations</b>	<b>400</b>	<b>400</b>	

\*= significant at 1% level; \*\* = significant at 5% level; and \*\*\* = significant at 10% level

**Source:** Authors' compilation based on field survey.

Analysis (Table 6) indicates that NNM evaluation of the access to food due to the treatment (Accessing CSR interventions of MOCs) is about 9%. We saw this as a success but decided to try both Radius and Kernel-based matching approaches to find out if the nearest neighbour created relatively poor matches as a result of the constraint of information. The result reveals that the estimated effect using RM algorithm is about 2% and that of KM matching algorithm is approximately 3%. This outcome confirms that the direct CSR of MOCs utilizing GMoUs have produced significant gains in improving the women's input in food security. Therefore, if the CSRs are appropriately channelled and gender mainstreamed, the probability that access to food will increase (as food will be both obtainable and stable) is high. And if such is accomplished, many women will be lifted out of extreme impecuniousness.

**Table 7.** Imbalance test results of observable covariates for three different matching algorithms via standardized difference in percent

<b>Covariates X</b>	<b>Standardized differences in % after</b>		
	<b>Nearest neighbour matching</b>	<b>Radius matching</b>	<b>Kernel-based matching</b>
Age respondent	4.3	18.5	13.4
Sex respondent	3.8	16.8	23.8
Primary occupation	9.5	25.8	17.1
Educational qualification	3.8	13.7	12.8
Annual income	2.3	15.9	11.1
Marital status	4.2	11.9	12.4
Household size	3.8	31.6	10.8
Perception of CSR	4.8	62.8	14.5
Constant	6.1	45.8	26.5
Mean absolute standardized difference	4.7	26.9	15.8
Median absolute standardized difference	2.3	15.9	11.1

**Source:** Authors' compilation based on field survey.

To further settle the robustness of the result, the imbalance of single observable features was further checked and we observed that the quality of NNM is much higher than that of the KM and RM in matching. Analysis (Table 7) further showed that the overall balance of all covariates between treatment and control endorses the higher quality of NNM. This is due to the fact that the KM and RM have mean and the median with absolute standardized variance after matching far above the threshold of 5%. The nearest neighbour matching is rationally below as expected. Our results, thus, suggest that CSR activities of the MOCs have a higher average treatment effect (ATT) of access to food, availability of food, food utilisation and stability of food when compared to their counterparts with the same propensity score. The study has established that CSR interventions have the innate prospect of transforming and endowing African women to take part in production, processing (treatment), and preservation of food to improve food security in Nigeria and the entire continent of Africa in general. A vital component of accomplishing a far-reaching economic growth and advancement in this region will be by harnessing the growth aptitudes of these women by mainstreaming gender in the multinationals CSR activities.

On the whole, the results of this study indicates that gender gaps in food security exist even though women institute the majority of food producers in the Niger Delta and are often running their families' nutritional needs. These impecunious women are often doing this despite gender norms and restraints that hamper their access to productive resources, as well as world-wide and national forces that force down the market value of their own products while raising prices of food they need to buy. However, the results also show a close correlation between MOCs' CSR gender equality and food security cum nutrition. The findings propose that the relative priorities of MOCs' CSR activities in the Niger Delta should vary from the classic, American ordering, as proposed by Carroll (1991). Placing significance on a cultural context in the determination of suitable CSR priorities and programmes as suggested by Visser (2006) is essential in the context of the rural Niger Delta. There is also the need for suppleness, as suggested by Amaeshi *et al* (2006), in addressing the distinctiveness of the socio-economic challenges in the region, which includes closing the gender gap in food and dietary security. Muthuri (2012) also agreed in that it is vital for CSR intervention in Africa to include reduction in poverty, and gender equality. But in extension, as our contribution to the issue of discourse, we would argue that MOCs' CSR can play a vital role towards gender-just food and dietary security when investment in gender and

food security is planned out for women to also have the right to be like partners in the agricultural sector. By implication, women will then have equal access to land, credit, and revenue. Working towards equal representation and active commitment of both women and men in GMoUs programmes and projects would be necessary if their variable needs and priorities are properly aimed at. It is our strong view that the private sector, generally, is well furnished and positioned to address some of the logistical and cultural problems that face women's involvement in the four pillars of food security recognised during the world summit on food security in 2009 in the Niger Delta (availability, accessibility, utilization and stability). MOCs, specifically, are well positioned to chart out gender equality and handle environmental implication of current food system in the region. Thus, working towards enhancing women's role in food and nutritional security should be ranked highly in CSR practices in the Niger Delta because doing so can help better the environment for business activities in the region.

## **5. Conclusion and policy implications**

Traditionally, Niger Delta people are farmers and fishermen. Women are important in the translation of the farm produce into food and dietary security for their families (household). They are usually the farmers who cultivate food crops and make available commercial crops together with the men in their families (households) as a means of making money. When women have money, extensive evidence shows that the money is more or less used for providing food and meeting children's needs. Women are generally in control of food variety and preparation as well as the care and feeding of their children. Despite often restricted access to either local or global markets, they institute the bulk of food producers in the region and generally manage their families' dietetic needs. They accomplish this despite deep-rooted gender inequalities and increasing unpredictability of food prices. Yet, their personal food security and nutrition needs – and often those of their daughters – are being unattended to at the family (household) levels, where prejudiced social and cultural norms triumph. Thus, we posit as follows:

- CSR of MOCs utilizing GMoU has failed to substantially aid the development of rural women's involvement in the four pillars of food security -- food handiness, food access, food use, and food solidity – in the Niger Delta region of Nigeria.
- CSR of MOCs utilizing GMoU has no substantial impact on the role of women in food and dietary security in the Niger Delta region of Nigeria.

A working sum total of 800 rural women were sampled across the Niger Delta region. The findings from the use of a combined propensity score matching (PSM) and logit model show that CSR activities of the MOCs utilizing GMoUs have notably contributed in granting women a space in food and dietary security. It achieved this by improving coherence in policies on nutrition, gender, health, agriculture, trade and other pertinent areas in the region. The results also reveal that CSR activities of MOCs sustained ecological sound methods to food production, such as agro-ecology, that encourage sustainable farming and women's enablement in the region. Hence, it is not hard to see from the findings that business has a key role to play in gender and food security transformation process, with much of its contribution capable of being framed in terms of CSR of MOCs in host communities. This proposes that identifying and valuing the local knowledge of farmers, including that of women farmers, for increasing locally appropriate food and nourishment security solutions which are gender fair will better food security in sub-Saharan Africa. This entails that encouraging the application of all people's right to food and, in precise women's, as well as women's rights to other possessions like land; in addition to also involving women and men in fighting the unbalanced circulation of food within the family (household) will make stronger food security in Africa. This research adds to the gender debate in agriculture from a CSR standpoint in evolving countries and serves as a basis for demanding social project by host communities. It settles that business has a responsibility to assist in resolving problems of public concern. Most critically, it is suggested in this study that the relative priorities of CSR in the oil host communities in Nigeria are likely to be different from the classic, American ordering. This finding remains speculative and provocative and would, therefore, benefit from further research. However, if confirmed, this raises several important issues regarding the CSR debate in Africa. Nevertheless, the main limitation of the study is that it cannot be applied beyond the scope of rural areas in Nigeria's Niger Delta region. Therefore, the outcomes cannot be prevalent to other African countries with the same policy problems. Based on this inadequacy, reproducing the analysis in other countries is advisable in order to observe whether the recognised nexuses endure empirical examination in dissimilar rural contexts of Africa.



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