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## Herder-Farmer Conflict in sub-Saharan Africa and Corporate Social Responsibility in Nigeria's Oil Host Communities

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**Joseph Ikechukwu Uduji**
(Corresponding Author)
Department of Marketing,
Faculty of Business Administration, Enugu Campus,
University of Nigeria, Nsukka, Nigeria
E-mails: joseph.uduji@unn.edu.ng; joseph.uduji@gmail.com;
joseph.uduji@yahoo.com


**Nduka Elda Vitalis Okolo-Obasi**
Institute for Development Studies, Enugu Campus,
University of Nigeria, Nsukka, Nigeria
E-mails: nduka.obasi.pg82232@unn.edu.ng; ndukaelda@gmail.com; eldanduka@yahoo.com


**Joy Ukamaka Uduji**
Department of Human Kinetics and Health Education
Enugu State University of Science and Technology
Agbani, Enugu State, Nigeria
E-mail: udujijoyukamaka@gmail.com;


**Longinus Chukwudi Odoh**
Department of Accountancy,
Faculty of Business Administration, Enugu Campus,
University of Nigeria, Nsukka, Nigeria
E-mail: longinus.odoh@unn.edu.ng

**Deborah Chinwendu Otei**
Department of Marketing,
Faculty of Business Administration, Enugu Campus,
University of Nigeria, Nsukka, Nigeria
E-mail: chinwendu.okonkwo@unn.edu.ng


**Happiness Ozioma Obi-Anike**
Department of Management,
Faculty of Business Administration, Enugu Campus,
University of Nigeria, Nsukka, Nigeria
E-mail: ozioma.obi-anike@unn.edu.ng;


**Emmanuel Ejiofor Nwanmuoh**
Department of Marketing,
Faculty of Business Administration, Enugu Campus,
University of Nigeria, Nsukka, Nigeria
E-mail: emmanuel.nwanmuoh@unn.edu.ng


**Kristopher Onyekachi Okezie**
Department of Marketing,
Faculty of Business Administration, Enugu Campus,
University of Nigeria, Nsukka, Nigeria
E-mail: obiayom2016@gmail.com


**Oliver Uzonna Ngwuoke**
Department of Marketing,
Faculty of Business Administration, Enugu Campus,
University of Nigeria, Nsukka, Nigeria
E-mail: ugwuokengwuoke@gmail.com


**Benjamin Uchemefuna Ojiula**
Department of Marketing,
Faculty of Business Administration, Enugu Campus,
University of Nigeria, Nsukka, Nigeria
E-mail: uchebeno20@yahoo.com

**Samuel Chukwuemeka Ezuka**
Department of Marketing,
Faculty of Business Administration, Enugu Campus,
University of Nigeria, Nsukka, Nigeria
E-mails: chukwuemeka.ezuka@unn.edu.ng


**Rollins Chiyem Iyadi**
Department of Marketing and Entrepreneurship,
Faculty of Management Sciences,
Delta State University, Abraka, Nigeria
Emails: iyadirollins@yahoo.com; criyadi@delsu.edu.ng;

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**Joseph Ikechukwu Uduji, Nduka Elda Vitalis Okolo-Obasi, Joy Ukamaka Uduji, Longinus Chukwudi Odoh,   Deborah Chinwendu Otei , Happiness Ozioma Obi-Anike, Emmanuel Ejiofor Nwanmuoh,  Kristopher Onyekachi Okezie ,  Oliver Uzonna Ngwuoke,   Benjamin Uchemefuna Ojiula, Samuel Chukwuemeka Ezuka  & Rollins Chiyem Iyadi**

## Abstract

There have been increasing demands on multinational oil companies (MOCs) to provide community development programmes and security to their host communities in Nigeria. This is mainly because developmental projects and security are lacking in most of these communities and most of the time they are not provided by government. Thus, we set out to examine the impact of MOCs' Corporate Social Responsibility (CSR) model on cutting the main drivers cum prompters of herder-farmer violence in the Niger Delta expanse of Nigeria. Results from the use of both propensity score matching and logit model indicate that, though, a very skimpy part of the CSR intervention are specifically aimed at alleviating herder-farmer conflict, the CSR has made momentous impact in the drops in land deprivation, social disparities, pressure over land as well as bettering people's lives in the region. The finding suggests that MOCs are well positioned to tackle the drivers and triggers of farmer-herder violence, when investment in cluster development boards (CDBs) is designed to improve land management infrastructure, train local leaders in dispute resolution techniques, and prioritize trust between communities and the security forces. This implies that business has an obligation to help in solving problems of public concern.

## Keywords

# 1. Introduction

There has been an increment in herder-farmer conflict in sub-Saharan Africa over the past 10 years with geographical concentrations in Nigeria, Northern Burkina Faso, and Central Mali (Brottem, 2021). Nigeria has witnessed the highest number of herder-farmer losses in the region, and this trend has been largely upward, with 2,000 deaths noted in 2018 (Akov, 2017; ACCORD, 2018;). The destructive violent events between pastoralist and farming communities in Nigeria have centered on the North-West, Middle Belt, and even recently Southern States (Gursoy, 2019; Adeoye, 2017). Reacting to the growing violence, several state governments in Nigeria have embraced anti-open grazing laws that necessitate the bringing of livestock to market by rail, car or vehicles, rather than on foot, in order to reduce potential conflicts with farmers (Ojemere, 2021). Initially endorsed in 2016 in four states - Benue, Taraba, Edo, and Ekiti - the laws are seen as proscription on nomadism, signifying a danger to the lifestyle of some pastoralist (Brottem, 2021). In Nigeria's Niger Delta region, violence concerning pastoralist herders has been rising in recent years, and the latest clashes between herders and farmers point to changes in the context and dynamics of the lasting conflict (Onyima and Iwuoha, 2015; Adibe, 2020). The conflict is sprouting from spontaneous attacks to planned ones comprising of targeted killing, demolition of properties, and other forms of criminality including the evil act of kidnapping for ransom. The conflict could worsen and take on precarious ethnic, religious, and criminal dimensions, if not alleviated (PIND, 2022, 2023). This could unfavorably influence the dynamics of insecurity in the region, with momentous political, socio-economic, and security concerns.

Meanwhile, the Nigerian economy is so much dependent on the oil sector. The Niger Delta where multinational oil companies (MOCs) are seriously occupying has become a place of relentless violent conflicts. The federal government of Nigeria (FGN) is keeping joint-venture agreements with the

MOCs settling in the region. The FGN not only owns but also is in-charge of the land as well as its natural resources in the subsoil; lands can be obtained by the government for over-riding reasons by the virtue of the Land Use Act 1978 (Asgil, 2012). The negative influences of the undertakings of MOC in the region include gas flaring, spillage of oil, pollution of the environment, negative social impacts, clashes and viciousness amongst others (Francis et al, 2011; Nzeadibe et al, 2015). However, MOCs partake in a plethora of corporate social responsibility (CSR) accomplishments in the Niger Delta and other parts of Nigeria. Each year, MOCs put in finance in social projects cum programmes in communities primarily in the Niger Delta (Chevron, 2014, 2017; Uduji et al, 2021, 2022). At the early days, the investments were in agricultural enlargement programmes in the sixties but grew over the years to include water projects, small businesses, healthcare, roads and infrastructure, and education, which benefit the local communities gain from (SPDC, 2013, 2018). Over the years, MOCs have upgraded how they get involved with local communities in delivering these projects. In 2006, they brought to light a new way of doing deals with communities called the global memorandum of understanding (GMoU). The GMoUs represents a key shift in tactics, placing emphasis on an open and more reliable process, uninterrupted communication with the grassroots, sustainability and the prevention of conflict (SPDC, 2013). Under the agreement, the communities decide the area of need while MOCs provide money that will guarantee the smooth execution of the project for five years (Chevron, 2014). A GMoU is a written statement between MOCs and a group (or cluster of several communities) which is based on local government or clan/ historical affinity lines as recommended by the appropriate state government. The cluster development board (CDB) operates as the core supervisory and administrative organ, certifying carrying out of projects and setting out plans/programmes (SPDC, 2018). This new model replaces the former in which MOCs execute hundreds of separate development projects with separate communities as well as managing them directly and distinctly (Chevron, 2017).

All the same, the advent of CSR – GMoU model has been largely seen as a tactic the MOCs use to shrink public criticism of their behaviours, and a way of sidestepping government regulation (Frynas, 2009; Idemudia, 2014). This means that as an idea, it has been heavily disparaged, and there is now fierce debate over its value and practical effects. While those who believe in GMoU see it as a vehicle for potentially bolstering a hoary dynamic in business-community relationships, those against it see it as a grounds for old institutions to provide new functions (Slack, 2012; Idemudia, 2014). This variance in views unvaryingly sets the context for the CSR debate, placing those in favour of protecting already deeply-rooted business-community relationships against those who maintain that business-community relationships must acclimatize to shifting societal values (Lompo and Trani, 2013; Asgil, 2012; Renouard and Lado, 2012; Idemudia, 2014; Frynas, 2009; Slack, 2012). Against the afore-discussed background, this effort is a plus to sustainable peace-building and enlargement debate from the CSR standpoint of MOCs in four areas enjoying great attentiveness in the literature:

i. Is it provable that the MOCs GMoU intervened in herder-farmer conflict in the Niger Delta expanse of Nigeria?

ii. Can the activities of GMoUs of the MOCs be said to have noticeably impacted on key drivers and triggers of herder-farmer conflict in the Niger Delta expanse of Nigeria?

iii. To what degree has the MOCs' GMoUs activities helped in cutting the herder-farmer conflict in the Niger Delta expanse of Nigeria?

iv. What are the resultant effects of bringing down the growing complexity of herder-farmer conflict in the Niger Delta expanse of Nigeria?

## 1.1 Study hypothesis

There are ongoing confrontations between normadic herders and farmers in various rural communities of Nigeria for water, crop land and grazing options (Olumba et al, 2022). These

conflicts have raged for decades in Nigeria's Niger Delta, affecting the region's security, agriculture, human security and mobility (Ajala, 2020). As stated by PIND (2023), the herder-farmer conflict is responsible for more than 400 fatalities in the Niger Delta between January 2020 and February 2023. Recent incidents point out a rebirth of clashes between herders and farmers over the ability to access land for farming and grazing as well as for criminality like kidnapping for payoff. For instance, in February 2023, six residents including farmers and traders were allegedly killed and over 30 hectares of farmland destroyed during clashes between herders and farmers in Ute, Arimogija, and Molege communities in Ose Local Government Area (LGA), Ondo State (PIND, 2023). In March, 2023, two inhabitants including a community leader were allegedly killed during clashes between herders and fishers in Okumoni and Zarama communities in Yenagoa LGA, Bayelsa State (PIND, 2023). Also recently, March 27, 2023, a man was said to be killed, some residents seized and properties destroyed during clashes between farmers and armed herdsmen in Sobe community in Owan West LGA, Edo State (PIND, 2023). Following these reported mortality incidents caused by herder-farmer conflicts in the Niger Delta, we postulate that:

- The GMoUs have failed in cutting the main drivers and prompters of herder-farmer violence in the Niger Delta expanse of Nigeria.

The placing of this research is a departure from the existing African security literature, which has focused on, inter alia: conceptualizing eco-violence (Olumba et al, 2022); land use conflict between farmers and herdsmen in Nigeria (Adeoye, 2017); farmers–herdsmen's violent conflicts and politicization in Nigeria (Adibe, 2020); new drivers of herder – farmer conflict in Nigeria (Ajala, 2020); cattle rights verses human rights in Nigeria (Apeh et al, 2021); corporation and co-existence between farmers and herders in Ghana (Bukari et al, 2018); constructing the herder – farmer conflict

as (in)security in Nigeria (Chukwuma, 2020); desertification, migration, and herder – farmer conflict in Nigeria (Lenshie et al, 2020); oil, conflict, and dynamics of resource struggle in the Niger Delta (Mai-Bornu, 2019); the politics of farmer – herder conflicts in Northwest Cameroun (Mbih, 2020); discursive construction of the farmer – pastoralist conflict in Nigeria (Nwankwo, 2021); herder – farmer conflict and the politicization of violence in Nigeria (Nwozor et al, 2021); Fulani – herders and farmer crises under Buhari's administration – causes, effects and its management (Ogbette et al, 2018); land use conflict between farmer and herdsmen in Benue State in Nigeria (Ogebe et al, 2019); analysis of the root causes and the effects of conflict (Gursoy, 2019); security challenges of pastoralism in Central Africa (ICG, 2014); herder-farmer tensions in Africa's Sudano-Sahel (Luizza, 2019); understanding Fulani perspective on the Sahel crisis (Modibo, 2020); and herder-farmer conflict in South-East Nigeria (Okibe, 2022); understanding the herder-farmer conflict in Nigeria (ACCORD, 2018); widespread of kidnapping in Nigeria (Abdulkabir, 2017); why pastoralist in Mali join Jihadist groups (Benjaminsen and Boubacar, 2019); the growing complexity of farmer-herder conflict in West and Central Africa (Brottem, 2021).

Other subjects of the paper are presented as follows: literature and theoretical underpinnings as Section 2; a description of method and materials as Section 3; the empirical results and corresponding discussion as Section 4; then, concluding remarks, caveats and future research directions as Section 5.

## 2. Literature and theoretical underpinnings

### 2.1 Drivers and triggers of herder-farmer violence

According to Olumba et al (2022), water, crops, woods and fish supplies are critical resources for which individuals or groups compete, and their shortage is a result of environmental scarcity. Environmental scarcity refers to the scarcity of renewable resources, such as crop land, forest, river

water and fish stock (Adoye, 2017; Adibe, 2020; Akov, 2017). However, eco violence has been used to describe the violent conflicts caused by the scarcity of this renewable resources such as water and agricultural land; most notably the intractable and violent disputes between herders and arable farmers in Nigeria (Apeh et al, 2021; Bukari et al, 2018; Chukwuma, 2020). Furthermore, eco violence encompasses visible violence and its consequences and social injustice, environmental degradation, inclusive duties and connections between people and the environment (Mbih, 2020; Nwankwo, 2021; Nwozor et al, 2021). It is important to include environmental deterioration when discussing the idea of eco-violence; scarcity breeds conflicts and conflict wreaks harvoc on the environment; such a circumstance exacerbates the shortage of resources already in existence, resulting in further conflict (Ogbette et al, 2018; Ogebe et al, 2019; Okibe, 2022). Hence, the term eco-violence provides a better conceptualization of the conflicts in the sub-Saharan Africa between normadic herders and sedentary farmers.

However, Brottem (2021) believes that the surge in herder-farmer violence in sub-Saharan Africa has focused on Nigeria, then, along the Central Mali and Northern Burkina Faso corridor, as well as parts of Central Africa Republic (CAR). The statistic showing that there are geographic hotspots underscores the significance of having a grasp of the local and regional factors contributing to the violent outcomes. It also stresses that most herder-farmer disputes are resolved agreeably (ICG, 2020). Following is an appraisal of some of this conflict drivers. First of all is the growing land pressure factor. According to Luizza (2019), the commonest cause of herder-farmer conflict is crop damage as a result of passing livestock. Although, reputable local conventions dictate how such conflict should be resolved, the process can still collapse. As the rural population of Niger Delta region has grown intensely, many herders have seen their grazing lands put into farming making their

means of support more challenging. According to Olumba et al (2022), the rural population in the Sudano-sahelian zone of West and Central Africa has increased by more than 40 percent over the past 20 years, reaching a high 281,000,000 people. Over the past four decades, cropland has doubled in the area getting to nearly 25 percent of the total land surface, a trend scientists see as increasing speedily alongside the growth of population. Second factor is that of dispossession. According to Modibo (2020), the intrusion into grazing areas extends pastoralists' complaint that their rights to resources – be it land, water, wood, or forage – are frailer than those of farmers which implies that they have been ignored. According to Ojemire (2021), pastoralists usually only need seasonal access to resources, so their land rights are every so often treated as ancillary to those of farmers. Similarly, decisions on land use are often taken when pastoralist are not present, effectively not including them in the process (Akov, 2017). Even when laws are made to protect pastoral resource rights, they tend to go disregarded at the local level. For example, Abdulkabir (2017) noted that Benin has firm law barring cultivation within livestock corridors, but the laws are often overlooked because the corridors pass through traditional farming lands.

The next factor is the theft factor. According to Benjaminsen and Boubacar (2019), livestock is the most treasured resource across many rural communities and is a common target of theft. Increased incidence and degree of livestock theft is both a cause and effect of violent conflict; armed groups use stolen cattle to finance their undertakings. Brottem (2021), noted that the menace of theft causes herders to arm themselves to guard the animals; the increased demand for arms profits criminal syndicates that partake in arms trafficking. All these factors increase the possibility of violent disputes. According Gursoy (2019), aggrieved groups may see stealing livestock from communities they have been in conflict with as a form of justice. This has led to a quick increase in the number of community-based armed groups to presumably guard against livestock theft, though such armed

groups can also be tied up to reprisal violence. ICG (2020), observed that in many Nigerian States and parts of Central Africa, war economies have arisen around livestock trade networks and relocation routes. The fourth is the social inequalities factor. According to Benjaminsen and Ba (2021), recent changes in livestock ownership in some sites from rural pastoralist communities to wealthy urban dwellers have given rise to the view that herders are there for the interest of the elite. This has added to the collapse of traditional systems of mutual reliance such as the allocation of crop residue. Conversely, Mbih (2020) observed that this strengthens other conflict activators such as the possibility that a farmer will demand excessive fees of a herder for any damage to his crop. Similarly, Onyima and Iwuoha (2015) noted that a herder who has the support of political elites may refuse to take part in dispute resolution with local farmer on the supposition that the owners of the herds hold ample political influence to obviate accountability. Yet, another (the fifth factor) is the conflict of interest and mistrust. According to Walwa (2017a, 2017b), trusted dispute resolution institutions, including informal discussions, serve as a fulcrum for alleviating herder-farmer violent. If these arbitrating institutions are alleged to be subject to enticement, however, trust in the entire process is lost. According to Onyima and Iwuoha (2015), distrust in the arbitration process, hinders solving routine disagreements agreeably and easily.

## 2.2 Theoretical underpinnings

Environmental security is concerned with the linkages between environment and security, particularly between environmental causes, such as natural disaster, water shortages and famine, and their effect on the security of people and society (Dmitrieva et al, 2022). A major concern in this study is the potential of environmental degradation to lead to violent conflict such as herder-farmer conflict in Nigeria's oil host communities. Similarly, debates over indigeneity, property rights, and stewardships have sparked a rage of fascinating new works in political ecology that are beginning to

probe more deeply the relationships of identity and environment; raising new questions about the way we theorize culture and nature, and about the politics of conservation and resource management (Ajl, 2023). In this study, we aware of the instabilities and cultural constructedness of group self-identification while at the same time remaining sensitive to the validity of local historical narratives, practices, meanings, and attachment to place in Nigeria. The theoretical complexity and empirical and ethnographic detail of many of the studies constituting a new wave of attention to identity in political ecology have set a high standard and suggest a range of enquiry for future work in Nigeria's Niger Delta region (Uduji et al, 2024a, 2024b). However, the event of oil extraction in Nigeria is an elongated, intricate and often painful one, that to date has become apparently intractable in terms of its resolution and future cause (Okolo-Obasi et al, 2021). The happenings have become a development that has put individuals, politics and oil industry at loggerheads resulting in a landscape denoted by a lack of trust, paralysis and blame, set against a deteriorating situation for the community's concerned (Mai-Bornu, 2019). Oil exploration going on in the Niger Delta region for decades have no doubt affected the environment and lives of the people. While oil spills and haphazard flaring of gas has eventually caused ecological wreckage in the expanse (Kalama and Asanebi, 2019).

Thus, this study is a combination of the relative deprivation theory (Walker and Pettigrew, 1984), the frustration - aggression theory (Breuer and Elson, 2017), and African perspective of CSR (Visser, 2006), to clarify the fact that environmental injustice coming from the activities of MOCs unfavorably affect the land and people of the Niger Delta, particularly the farmers and herders. The formulation of the frustration – aggression theory concentrated on the limited intrusion with an expected realization of a desired goal on hostile (emotional) aggression, thus, indicating that when people find it difficult to realize their goals and objectives in any given system or society, they will end up reacting

otherwise by displaying aggressive qualities and propensities. Recent happenings have revealed that the frustration – aggression is designed to put it to scholars and researchers of human nature that when there is aggression, they should turn wary eyes on possibilities of the organism or group being threatened by frustration; and that when they view intrusion into individual or group habits, they should suspect, among other things, aggression (Kalama and Asanebi, 2019). The frustration – aggression theory states that aggression occurs due to frustration; when people are prohibited from reaching their objectives, frustration sets in. This frustration, according to frustration – aggression theorist, can degenerate into aggression when something prompts it (Breuer and Elson, 2017). Relative deprivation thus refers to the dissatisfaction people feel when they place their conditions to those in similar situations and find out they have been less treated than their peers. It is, hence, a situation that is measured by comparing the state of one's group to those of a similar group that gain more (Walter and Smith, 2001). In social sciences, it is used to explain out feelings or measures of economic, political, or social deficiency that are relative rather than absolute. The concept of relative deprivation has essential concerns for both behaviour and attitudes, including the feelings of trauma, political attitudes and involvement in collective action (Kalama and Asanebi, 2019). Carroll's (1991) CSR pyramid is obviously the model of CSR used by many; it has its four tiers displaying the relative significance of economic, legal, ethical, and philanthropic duties. The examination of CSR in Africa was used to test the rightness and applicability of Carroll's CSR pyramid (Visser, 2006). It reveals that if Carroll's basic four-part model is accepted, then, the value of CSR in Africa will vary from the classic American ordering. According to Uduji et al (2019a, 2019b), based on this, it is important to rely on cultural context in the determination of apposite CSR priorities and programmes; and there is need to recommend suppleness in methods of CSR policy and practice by multinationals functioning in Africa. Thus, this paper made effective use of a quantitative line of attack, but views

the findings from the frustration – aggression theory, the relative deprivation theory and application of CSR from African standpoint.

## 3. Method and materials

The study took on explanatory research design with an inbuilt quasi-experiment utilizing a quantitative method. We embraced quantitative technique because review of pertinent studies revealed a dearth of quantitative data on the convolutions of effect of corporates social responsibilities in Nigeria, particularly in the Niger Delta. The study executed a survey research between April to September 2022 to source and document information from a representative sample in Niger Delta expanse. Cross-sectional data were gathered using semi-structured interview questionnaire. Figure 1 displays the component administrative states of the Niger Delta expanse in Nigeria.

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


### 3.1 Sample size

With the aid of a Fisher formula, we computed the sample size we put to use in the exploration.

The formula is denoted mathematically as:

$$= \frac{z^2 p(1-p)}{d^2}$$

Where, $n$ stands for sample size; $z$ represents standard normal deviation for a given level of

confidence, (95% confidence =1.96); $d$ stands for margin of error at 0.05 for CI at 95%; and $p$ is

for the proportion to be estimated. Thus, we calculated the sample size as:

$n = \frac{1.96^2 (0.5)(1-0.5)}{0.05^2}$ = $n = \frac{0.9604}{0.0025}$ = 384. However, to further guarantee that the acceptable

errors are minimized to the least, we considered the size of the expanse and properly provided

space for both the 'treatment' and 'control', we, then, multiplied the sample size by two. That

means that the total sample size used was 768 respondents.


### 3.2 Sampling procedure

A multi-staged sampling method helped in selecting the final respondents for the study. In making

such choices, we did not forget that samples must be chosen from communities where the MOCs

are heavily present while also bearing in mind communities that have formed or joined a cluster

development board (CDBs) and those that have not. From communities with CDBs, we selected

the treatment group, while the control groups were chosen from the communities without CDBs.

Therefore, making use of purposive sampling, we carefully selected two local government areas

(LGA) from each of states (9) that makes up the Niger Delta region. Then, in the second stage, we

selected from each of the picked LGAs, two communities on the basis of heaviness of MOC undertakings in such communities. We calculatedly picked one community that is from a CDB (CDB communities) and another that is not (non-CDB communities). While the CDB communities were taken to be 'treatment', the non-CDB communities were seen as 'control group'. With the assistance of the community gate keepers, we randomly chose 384 respondents from the treatment group and same number from the control group in the final stage to make up for the needed 768 respondents. The sample came from the population of states as shown below:

**Table 1.** Sample size distribution table

| States | Total Population | % of total population | State Sample | CDB Community | Non-CDB Community |
|---|---|---|---|---|---|
| Bayelsa | 2,277,961 | 5.3 | 41 | 20 | 21 |
| Abia | 3,727,347 | 8.7 | 67 | 34 | 33 |
| Cross River | 3,866,269 | 9.1 | 70 | 35 | 35 |
| Edo | 4,235,595 | 9.9 | 76 | 38 | 38 |
| Ondo | 4,671,695 | 11.0 | 84 | 42 | 42 |
| Imo | 5,408,756 | 12.7 | 97 | 48 | 49 |
| Akwaibom | 5,482,177 | 12.9 | 99 | 50 | 49 |
| Delta | 5,663,362 | 13.3 | 102 | 51 | 51 |
| Rivers | 7,303,924 | 17.1 | 132 | 66 | 66 |
| | 42,637,086 | 100.0 | 768 | 384 | 384 |

**Source:** FGN, 2017/Authors' computation.

### 3.3 Data collection

We garnered working data with participatory appraisal technique. A written structured questionnaire (SQ) was used to elicit the view of the people being studied which is primarily important in achieving the intents of the study. We made use of the **SQ** as a key tool for generating data from the 768 respondents. This was administered directly to the respondents and completed by the researchers with the aid of local research assistants hired due to inevitable challenges. These challenges include effective comprehension of the instrument by the respondents without guides; the researchers

lacking the ability to speak the diverse local languages and dialects of the many ethnic groups in the sampled rural communities as well as traversing the rough and insecure territory of the expanse by the researcher without the assistance of those indigenous to the communities. This method of administration ensures that the instrument was administered to the respondent in the best language he/she can understand and that one hundred percent of the instrument was duly completed and collated.

### 3.4 Validation and reliability test of the instrument

While validity of an instrument is the degree to which it can capture in right qualification that which it is set out to measure, reliability of such instrument is determined by the level of consistency of result obtained in using the instrument repeatedly (Okolo-obasi and Uduji, 2021). Therefore, to establish the content validity of the survey instrument used for primary data collection in this study; we engaged the services of experts both in the academia and otherwise to make input both before and after pilot testing of the instrument.

Also, to confirm reliability of the instrument, the researchers carried out pretest with 40 respondents randomly selected from two local government areas in Niger Delta states of Akwaibom, Delta and Imo. The response from the pretest were analyzed using Cronbach's alpha index of reliability whose result indicated 82%.

### 3.5 Observation of Ethics

In this study, we acknowledged that the footing of ethical research is 'informed consent'; as a result, we embraced the ethics of informed consent. All the participants in the survey were made to have a clear knowledge of the questions and how the data were expected to be utilized. They were also guaranteed that there are no implications thereafter. In carrying out this study, we entered into a

consent agreement with leaders of each community. Here we spelt out who the researchers and their assistants are, the aim of the study, what data to be collected from participants and how the data will be utilized/reported, as well as the possible dangers (if any) of participating in the study. We did this because we were duly informed that participant will not participate without the consent of community gate keepers, hence, the consent needed was the consent of the community leaders who then helped us to select final respondents.  In no way was force, coaxing or pressure used on any respondent or participant into getting involved in this study. We kept up privacy and discretion of information as assured to the voluntary participants (respondents).

### 3.6 Analytical framework

The study made use of propensity score matching (PSM) and logit regression model in assessing the effect of corporate social responsibility of the multinational oil companies on dealing with herders-farmers clash in sub-Saharan African particularly in the oil rich Niger Delta expanse of Nigeria.  We adapted with modification Lompo and Trani (2013), Uduji and Okolo-obasi (2022) combination of PSM and Logit to ensure that we overcome the problems of selectivity and endogeneity.

In using the PMS, respondents from the CDB communities were taken to be "treatment" while an ideal to be used as a comparison group was selected from a larger survey and placed side by side to the treatment based on set of perceived characteristics. This ideal comparison group was chosen from the non-CDB communities and is taken to be "control" so that we can evaluate an average treatment outcome of CSR of MOC making use of GMoUs.   In line with the ideas of Renouard and Lado, (2012), the propensity score matching requires predicting the outcome of an undertaking on treatment based on perceived covariates for both the control group and the treatment group. Based on this, the resolution to be treated (CSR intervention) in this study, although not haphazard, relies on the variables observed. This basically denotes that, in getting the effect of the GMoUs of

the MOCs on alleviating headers - farmers crisis, we represented the treatment group with $R_i = 1$ for respondent 1 and represented the control group with $R_i = 0$. Subsequently, we executed a matching of the treatment and the control group based on the propensity scores: (likelihood of getting CSR of MOCs using GMoU, given observed characteristics). This brought us to:

$$P(X_1) = \text{Prob}(R_2 = 1/X_2) \ (0 < P(X_2) < 1) \qquad \text{Equation 1.}$$

Here pre CSR control variables vector is symbolized by $X_1$ when $R_1$'s are independent over all 1 and the findings are independent of CSR given $X_1$. Then, the findings are also independent of CSR given $P(X_1)$ as they would likely do if CSR are received arbitrarily. In making sure that the study comes to near exact suppositions on the effect of CSR undertakings using GMoUs on headers-farmers crisis, the study ducked the bias of choosing of observables by matching on the possibility of the treatment (covariates *X).* Hence, we reach a definition of the PS of Vector X as:

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

With Z signifying the treatment indicator equating to 1 as long as the as the chosen individual has evaluated direct enablement aimed at ending header-farmer crisis, and zero otherwise.

Due to the propensity score being a balancing score, the observables *X* will be dispersed same for both treatment and control and the variances are considered to be trait of treatment.

In the study, four steps in agreement with Lompo and Trani (2013) were amended from the literature to make sure that there is an unbiased impact estimates. To begin with, being mindful that the likelihood of getting CSR of the MOCs utilizing GMoUs is projected by a binary response with applicable observable characteristics, we combined two individual group, (one Treatment one

Control). After this, we assessed the logit model of getting CSR of MOCs using GMoUs as a role of some socio- economic qualities variables as thus:

$$P(x) = Pr(Z=1/X)=F(\alpha_1 x_1 \ldots \ldots + \ldots \alpha_n x_n)=F(x\alpha)=e^{x\alpha} \qquad \text{Equation 3}$$

This made it possible for us to create value of the possibility of receiving CSR from the logit regression allocating each respondent a propensity score. The respondent in the control group with very poor PS outside the array found for treatment were let go at this point. For each respondent getting CSR, a non-receiving respondent that has the nearest propensity score as measured by absolute variance in score seen as nearest neighbour was acquired. That tells why the study used the nearest five neigbours for more arduous assessment. The variance between the mean values of the result (treatment and control groups) of indicators for the nearest five neigbours is projected as the average treatment effect on the treated (ATT). The true ATT, based on PSM is written thus:

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

EP(X) stands in place for the expectation with respect to the circulation of PS in the population. In this, we accomplish an acceptable match of participants with their counterfactuals in as long as their observable qualities are identical. We used three diverse matching methods (radius, nearest neighbour, and kernel-based) matchings in attaining this matched pair.

In the third place, the matching appraisers' quality was checked by standardized variances in observables' means between treatment and control. Standing for variance in percent after matching with X for the covariate X, the dissimilarity in sample means for treatment taken to be ($\check{X}_t$) and that

of matched control taken to be ($\acute{X}_0$). Flowing with Renouard and Lado, (2012), the sub-samples as a percentage of the square root of the average sample variances is presented as: $(\int_1^2 and \int_0^2.)$.

Thus:

$$|SD = 100 * \frac{(\acute{X}_1 - \acute{X}_0)}{\left(.05 \int_1^2 and \int_0^2.)1/2\right)} \qquad \text{Equation 5}$$

We anticipated that the balance among the diverse observable qualities between the matched groups is satisfactory after accepting a left over bias below 5% after the matching.

By and large, while putting into consideration the quasi-experimental design of the GMoU, there is the chance that unobservable factors like respondents' inherent motivation and specific aptitudes or preferences, had affected the choice to be in treatment or control. We, thus, evaded the problem of hidden bias by engaging the use of bounding approach. By doing this, we made up for the above equation 3 of the logit model to assess the propensity score by a vector $U$ comprising all unobservable variables and their effects on the possibility of getting CSR and captured by γ:

We attained the equation thus:

$$P(x) = Pr(Z=1/X) = F(X\alpha + U\gamma) = e^{X\alpha U\gamma} \qquad \text{Equation 6}$$

After testing the strength of the impact of on treatment with sensitivity analysis, it was possible for us to alleviate the effect of γ on getting CSR on potential results. In view of that, the treatment possibility of both respondent is put to work in line with the bounds on the odds ratio as indicated thus:

$$: \frac{1}{e\gamma} \leq \frac{P(Xm)(1-P(Xn))}{P(Xn)(1-P(Xm))} \leq e\gamma \qquad \text{Equation 7}$$

Scholars like Lompo and Trani (2013) and Renouard and Lado (2012), have maintained that both individual respondent have the same likelihood of treatment, if they are alike in X, only if $e\gamma = 1$

## 3.5 SCOTDI

SCOTDI (Shell Community Transformation and Development Index) is a complex index for weighing, scoring and ranking how the GMoU cluster fared based on five-key criteria (limpidity and accountability, inclusiveness and involvement, control (governance) and democracy, business climate and progress towards sustainability), which are unswerving with international best practice in development discourse (SPDC, 2018). It is an initiative of Shell Petroleum Development Company (SPDC) which stands for an innovative structure (framework) that integrates and implements these international principles into a compound index in a way that is accessible to local context (SPDC, 2013). For comprehensive knowledge regarding the perceptions of the respondents about their participation in GMoUs undertakings, we sought the views of the respondents using the six essential criteria as developed by Shell (the SCOTDI). We put into consideration the respondents' view on issues of inclusiveness, limpidity, governance, involvement, continuity, and results of the CSR of MOCs making use of GMoUs in the Niger Delta expanse.

## 4. Results and discussion

### 4.1 Descriptive analysis

The study commenced the examination of the responses with a description of some social (academic), demographic (age, marital status, family size), and economic (employment, household earnings) characteristic. These characteristics are imperative in comprehending the dissimilarities in the socio-economic and demographic status of the respondents in the treatment group (from the

CDB communities) in comparison to their matching part in the control group (non-CDB communities) in the Niger Delta expanse.

**Table 2.** Socio-economic Characteristics of Respondents in the Niger Delta Region.

| Variables | Treatment Group | | | | Control Group | | |
|---|---|---|---|---|---|---|---|
| | Freq | % | Cum | | Freq | % | Cum |
| **Sex of Respondents** | | | | | | | |
| Males | 202 | 52.5 | 52.5 | | 260 | 67 | 67 |
| Females | 182 | 47.5 | 100 | | 124 | 33 | 100 |
| Total | 384 | 100 | | | 384 | 100 | |
| **Age of Respondents** | | | | | | | |
| Less than 20 years | 14 | 4 | 4 | | 22 | 6 | 6 |
| 21-25 years | 41 | 11 | 15 | | 64 | 17 | 23 |
| 26-30 years | 85 | 22 | 37 | | 61 | 16 | 38 |
| 31 - 35 years | 73 | 19 | 55 | | 59 | 15 | 54 |
| 35 - 40 years | 60 | 16 | 71 | | 60 | 16 | 69 |
| 41 - 45 years | 50 | 13 | 84 | | 39 | 10 | 79 |
| 45 - 50 years | 42 | 11 | 95 | | 49 | 13 | 92 |
| Above 50 years | 19 | 5 | 100 | | 30 | 8 | 100 |
| | 384 | 100 | | | 384 | 100 | |
| **Level of Education** | | | | | | | |
| None | 23 | 7 | 7 | | 73 | 19 | 19 |
| FSLC | 169 | 43 | 50 | | 188 | 48 | 67 |
| WAEC/WASSCE | 118 | 31 | 81 | | 79 | 21 | 88 |
| Degree and above | 74 | 20 | 100 | | 44 | 12 | 100 |
| | 384 | 100 | | | 384 | 100 | |
| **Marital Status** | | | | | | | |
| Single | 52 | 14 | 14 | | 63 | 17 | 17 |
| Married | 221 | 56 | 70 | | 174 | 45 | 61 |
| Widow | 59 | 16 | 86 | | 82 | 22 | 83 |
| Divorced/Separated | 52 | 14 | 100 | | 65 | 17 | 100 |
| | 384 | 100 | | | 384 | 100 | |
| **Household Size** | | | | | | | |
| 1-4 Person | 241 | 61 | 61 | | 198 | 51 | 51 |
| 5-9 Person | 104 | 27 | 88 | | 110 | 29 | 79 |
| 10-14 Person | 31 | 9 | 97 | | 62 | 17 | 96 |
| 15 Person and above | 8 | 3 | 100 | | 14 | 5 | 100 |
| | 384 | 100 | | | 384 | 100 | |

## Primary Occupation

| | | | | | | |
|---|---|---|---|---|---|---|
| Fishing | 87 | 23 | 23 | 76 | 20 | 20 |
| Trading | 52 | 14 | 36 | 44 | 11 | 31 |
| Farming | 158 | 41 | 77 | 178 | 46 | 78 |
| Paid Employment | 35 | 9 | 86 | 36 | 9 | 87 |
| Handicraft | 40 | 10 | 97 | 20 | 5 | 92 |
| Headers | 12 | 3 | 100 | 30 | 8 | 100 |
| | 384 | 100 | | 384 | 100 | |

## Annual Income

| | | | | | | |
|---|---|---|---|---|---|---|
| 1000 - 100,000 | 9 | 2 | 2 | 30 | 8 | 8 |
| 101,000 - 200,000 | 52 | 14 | 16 | 86 | 22 | 30 |
| 201,000 - 300,000 | 121 | 32 | 47 | 152 | 40 | 70 |
| 301,000 - 400,000 | 96 | 25 | 72 | 24 | 6 | 76 |
| 401,000 - 500,000 | 51 | 13 | 86 | 10 | 3 | 79 |
| 501,000 - 600,000 | 39 | 10 | 96 | 52 | 14 | 92 |
| Above 600,000 | 16 | 4 | 100 | 30 | 8 | 100 |
| | 384 | 100 | | 384 | 100 | |

## Value of receipts Through CSR

| | | | |
|---|---|---|---|
| 1000 - 50,000 | 20 | 5 | 5 |
| 51,000 - 100,000 | 35 | 9 | 14 |
| 101,000 - 150,000 | 67 | 17 | 32 |
| 151,000 - 200,000 | 58 | 15 | 47 |
| 201,000 - 250,000 | 83 | 22 | 68 |
| 251,000 - 300,000 | 98 | 26 | 94 |
| Above 300,000 | 23 | 6 | 100 |
| | 384 | 100 | |

**Source:** Computed from the field data by authors

The examination (Table 2) indicates that, while 53% of respondent in the treatment group are male about 67% in the control group are in the same category. This could be a sign that involvement of women in the CDB communities is higher than that of non-CDB communities. The average age of the respondents in the treatment group is around 31 years, for the control it is around 36years. In the treatment group, while about 37% are not up to or just 30 years of age, for the control it is about 38%. Likewise, while about 40% of respondents from the treatment are farmer, just roughly 4% are herders; also in the control group, the flow is similar: about 9% are headers, while as much as 45%

are farmers. This clearly indicates that the number of farmers are much more than that of herders in both the treatment and control groups.

In education achievement, only about 7% of the respondent from the treatment have no formal education, the control group have approximately 19% of their respondents unlearned. This shows that the tendency for conflict to result into physical fight is lower with the treatment group compared to the control. This finding tally with Asongu et al (2019) in that being educated in a formal way has a high tendency of lowering violence. Further review here reveals that bulk (87%) unlearned are from the headers in comparison to other jobs. In reverse order, regardless of being in treatment or control, the average annual earnings of both groups is still very poor. While in the treatment, the average income is NGN280, 000 (about 602 USD) yearly, that of the control is NGN260, 000 (roughly 600 USD) yearly. A closer examination of the data reveals that, average revenue of the headers is higher than that of other jobs and due to this, the number of respondent that make above 500,000 on yearly basis are more in the control group. All in all, there is a suggestion that the rate of impoverishment in the study area is still very much in the high.
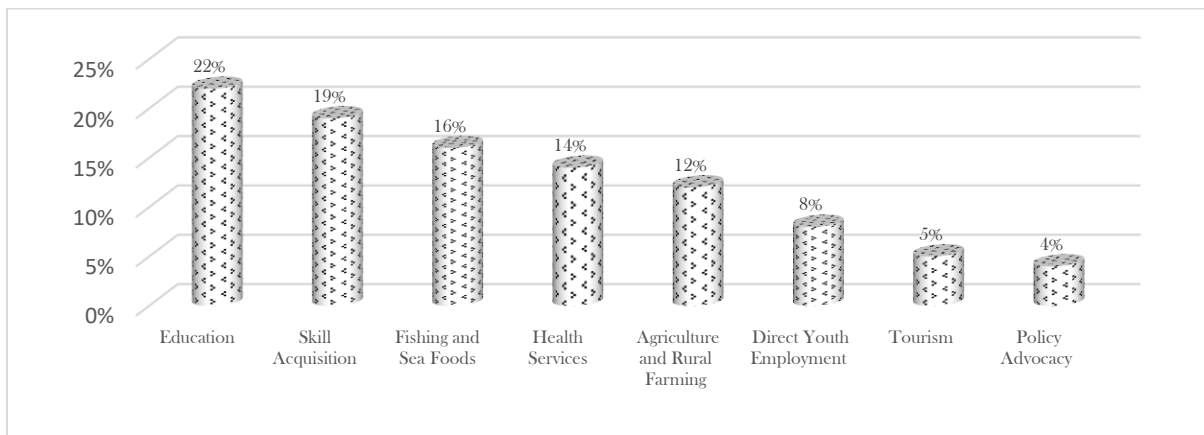


**Figure 2.** Percentage distribution MOCs' CSR using GMoUs by sectors as they affect men and women in the Niger Delta.

**Source:** Computed from the field data by authors.

Analysis (Figure 2) reveals a number of CSR intervention efforts that MOCs have made putting to use the GMoUs in many sectors that influence the lives of residents of host communities in the Niger Delta expanse. Access to these interventions varies from community to community, person to person due to some causes. The examination reveals that, roughly 22% of the undertakings of MOCs using GMoU went into training (education) including scholarships, bursary, and overseas training. Other sectors of involvement include, fishing and sea food collection about 16%, skill procurement that accounted for 19%, and health services took as much as 14%. Agriculture and rural improvement on the other hand accounted for 12%, direct engagement of youths 8%, tourism development and enablement 5% and policy advocacies and dialogues accounted for just 4%. This indicates that not much has been done about land retrieval, yet the stress on the demand for land kept rising higher with the mounting population and consequent demand for enlargement of businesses.
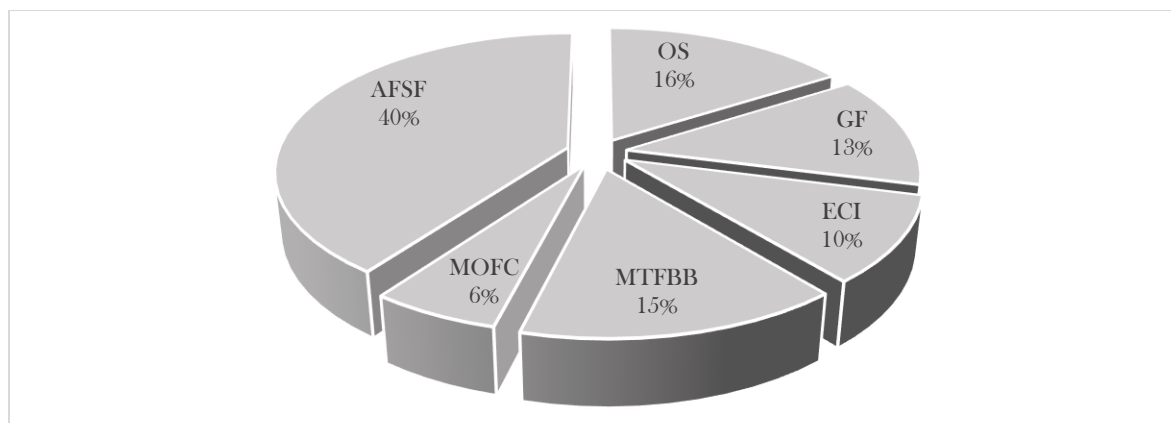


**Figure 3.** Percentage distribution land space in the Niger Delta.
**Source:** Computed from the field data by authors.

Analysis (Figure 3) reveals that, in the expanse, there is a serious shortage of arable land for farming and pasturing undertakings. From the analysis, it is obvious that the accessible fertile space for

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[1] OS = Oil spillages GF = Gas flaring, ECI = Excessive clearing for industrialization, MTFBB = Massive tree failing and bush, burning, MOFC = Militant occupied forest and creeks, AFSF = Available fertile space for farming

farming is only about 40% of all the lands in the expanse. While oil spillage and gas flaring have ruined almost about 29% of the land, (16% and 13%) respectively, great tree falling and bush burning took up 15%. Too much clearing of lands for industrialization took up about 10% and finally, militant engaged forest and creeks accounts for about 6% of the existing land spaces. This explains out why it appears conflict is on the increase as the headers and farmers continually engage on the little space where both crops and fodder can grow. This reveals serious attention being needed in the expanse considering that most land are water logged and problematic for animal grazing.
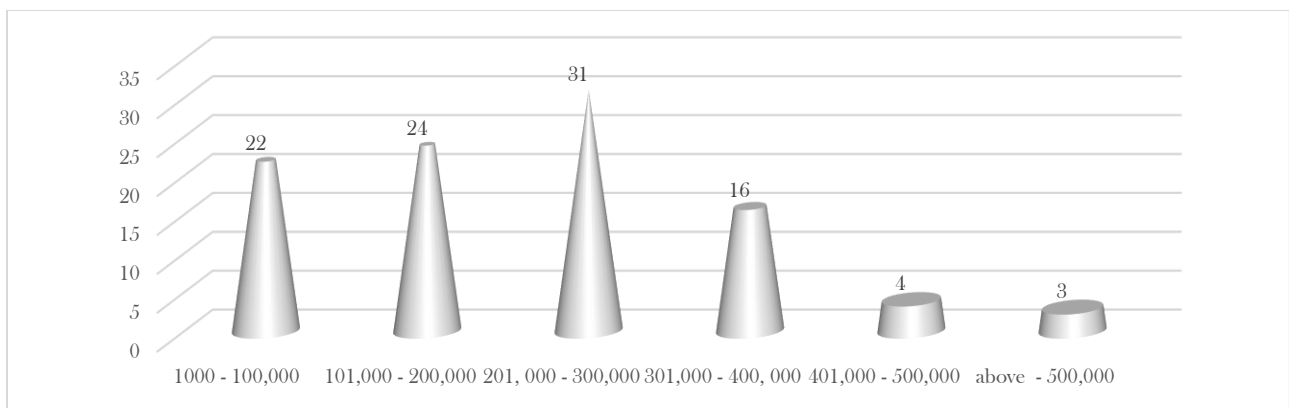


**Figure 4.** Rate of receipt of direct CSR intervention by respondents from MOCs in the Niger Delta.

**Source:** Computed from the field data by authors

The analysis (Figure 4) makes clear the rate of receipt of individual enablement of CSR activities by the respondents in the treatment group.  While about 22% of the respondents have been given between ₦ 1,000 – ₦ 100,000 ($2 -$200) in the past as direct CSR enablement intervention, about 24% have equally got between ₦101,000 – ₦ 200,000 ($202 -$400). Also, while roughly 31% of the respondents have been given between ₦ 201,000 to ₦ 300, 000($402 -$600) about 16% have got ₦ 301,000 to ₦ 400,000 ($602 -$800) and about 4% have been given between ₦ 401,000 to ₦ 500, 000 ($802 -$100). Just about 3% of the respondents have been given over ₦ 500,000 ($1000).

**Table 3.** Percentage rating of MOCs' CSR in helping respondents with access to and usage of land in the Niger Delta.

| CSR Activities of MOCs | Agip | Chevron | Total E&P | Shell | Exxon Mobil | Others | Average |
|---|---|---|---|---|---|---|---|
| Advocacy for changes in laws and practices | 6 | 8 | 7 | 9 | 8 | 10 | 8 |
| Acquisition of land for grazing reserve | 0 | 0 | 2 | 4 | 0 | 0 | 1 |
| Encouraging eco-friendly farming. | 17 | 19 | 20 | 18 | 21 | 19 | 19 |
| Skill training respondents on efficient use of available lands | 14 | 16 | 18 | 20 | 15 | 20 | 17 |
| Provision of high yielding varieties of animals and crops | 16 | 11 | 14 | 10 | 9 | 8 | 11 |
| Erosion controls | 15 | 14 | 14 | 13 | 18 | 19 | 16 |
| Land cleaning and reclamation | 20 | 18 | 15 | 17 | 18 | 16 | 17 |
| Compensation for crops damaged by grazing animals | 12 | 14 | 10 | 9 | 11 | 8 | 11 |
| | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

**Source:** Computed from the field data by authors

Analysis (Table 3) indicates that, in all the CSR undertakings that will lighten header-farmers clash, an average of roughly 8% went into advocacies and dialogues directed towards law reformation and changes in practices. Just as low as 1% on average went into procuring lands by the MOCs for grazing reserve in order to diminish the movement of animals to evade destroying farmers' crops. While about 19% of the undertakings went into backing up eco-friendly farming to make sure that the farmers take part in the best practices, about 17% was used for provision of satisfactory training on efficient use of the small lands accessible. Roughly 11% went into delivery of high producing varieties of crops and animals; then, about 16% was pushed into Erosion controls. Others are: land cleaning and reclamation, getting about 17%, and recompense for crops destroyed by grazing animals –11%. This is a sign that remarkable undertakings have gone into bringing down the herder-farmer crisis.
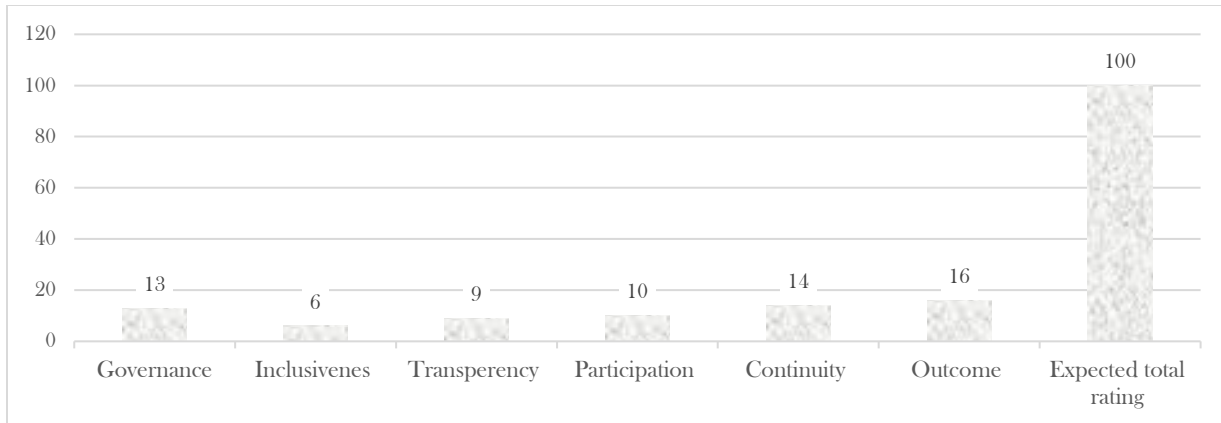
**Figure 5:** Percentage rating of involvement of respondents in the CSR of the MOCs using GMoU.
**Source:** Computed from the field data by authors

For detailed knowledge concerning the perceptions of the respondents' over their involvement in GMoUs undertakings, their opinions were computed using the six most important criteria, the Shell Community Transformation and Development Index (SCOTDI). Therefore, their perception on issues of inclusiveness, transparency, governance, participation, continuity, and outcome of the CSR of MOCs using GMoUs in the Niger Delta region were looked at.

Analysis (Figure 5) shows the overall rating of the involvement of the populace in CSR interventions using GMoUs. The respondents rated governance 13%, indicating clearly that only few people play a part in governance. Then, inclusiveness was rated 6%, transparency (9%), and participation (10%). Others are, continuity (14%), and outcome (16%). This rating shows that, though the GMoU give the impression of making significant impact on activities of the MOCs, the rating of involvement of the people shows that much still need to be done in the management of the CSR interventions of the MOCs. This finding agree with Asgil (2012), in that GMoUs have brought about better ownership and a stronger sense of pride amongst communities of the Niger Delta as they are responsible for executing their projects; the limpidity and accountability in the GMoU model makes

available a good platform for other local and international donor agencies to put in money into development projects directly through the Cluster Development Boards (CDBs).

## 4.2 Econometric analysis

We summarized the average variances in the basic scores and independent observable qualities between the treatment group and control group. The variances in means show that scores on decrease in land dispossession, reduction in growing land pressure, reduction of social inequalities, reduction of conflict of interest and mistrust, reduction in theft of crops and animals, and improved welfare of the people in the sample are all reasonably significant at 5% significant level with average difference of about 8.07%, 11.54%, 6.05%, 13.5%, 13.8% and 23.3% respectively.

On the other hand, the chosen observable characteristics show significant positive variances in means of education (2.62%); primary occupation (0.62%); annual revenue (1.16%), and earnings of other household members (0.82%). Likewise, the treatment group recorded negative variances in mean in Age (0.74%), Sex (0.26%), Marital Status (1.99%), and Family (Household) Size (1.76%). On farm features, the respondents from the treatment group recorded significant increase in farm type, with mean difference of 5.03%; land ownership type, with mean difference of 7.15%; source of input, with mean difference of 1.34%, and farming experience, with mean difference of 0.74%. Due to this, observable participation incentives can be identified, which accentuates the likelihood that selective placement exists and, thus, the need to put to use propensity score matching.

**Table 4.** Comparison of mean knowledge score and observable characteristics across treatment and control (N = 800)

| Access and Knowledge Score in Percentage of maximum score | Treatment | Control | Difference |
|---|---|---|---|
| Score on decrease in land dispossession | 27.42 | 19.35 | 8.07** |
| Scores on reduction in growing land pressure | 28.32 | 16.78 | 11.54** |
| Scores on reduction of social inequalities | 20.73 | 14.68 | 6.050** |
| Score on reduction of conflict of interest and mistrust | 33.08 | 19.56 | 13.52** |
| Scores on reduction in theft of crops and animals | 32.42 | 18.65 | 13.77** |
| Scores on enhanced welfare of the people | 35.62 | 12.34 | 23.28 ** |
| **Socio-Economic Characteristics** | | | |
| Age | 18.28 | 19.02 | -0.74 |
| Sex | 12.81 | 13.07 | -0.26 |
| Annual Income | 32.32 | 31.16 | 1.16 |
| Income of other Household Members | 7.25 | 6.43 | 0.82 |
| Household Size | 8.32 | 10.08 | -1.76 |
| Primary Occupation | 16.28 | 15.66 | 0.62 |
| Education | 22.83 | 20.21 | 2.62 |
| Marital Status | 20.32 | 22.31 | -1.99 |
| **Farm Characteristics** | | | |
| Farm Type | 14.31 | 9.28 | 5.03** |
| Farming Experience | 3.67 | 2.93 | 0.74*** |
| Source of Input | 11.75 | 10.41 | 1.34* |
| Land ownership type | 26.8 | 19.65 | 7.15** |
| **Observation** | **400** | **400** | |

**Source:** Computed from the field data by authors

In line with the features that capture both the treatment and the control's relevant observable differences, prediction of the likelihood of getting CSR was made using the Logit model built in equation 3. Analysis of the result (Table 5) reveals the projected coefficients, the odd ratio conveyed in terms of odds of *Z=1,* the marginal effects as well as the standard errors. Examination of the single observables pointed out that respondents' view of the MOC's CSR using GMoU, academic level of the respondents, experience of the respondents in the field, primary employment, and farm size (size of crop farm and number of cattle) are factors that positively impact on having access to the GMoUs. For example, the finding simply tells that the more intellectually exposed the respondents

are, the more the tendency for them to get access to the CSR of the MOCs using the GMoUs. On the other hand, farming experience unexpectedly affects the tendency to access the GMoUs negatively. Others, also in the negative, are age of the respondents, annual revenue, and earnings of other household members. The more these variables increase the more their chances of accessing the GMoUs drops.

**Table 5.** Logit model to predict the probability of treatment Conditional on Selected Observables

| Variables | Coefficient | Odd Ratio | Marginal Effect | Std. Error |
|---|---|---|---|---|
| Constant | 1.816 | 5.131 | .00261 | .667 |
| Age | .028 | .983 | .009 | .019 |
| MS | .-013 | 1.930 | .00135 | .130 |
| Edu | .007 | 1.017 | .051** | .012 |
| PriOcc | .319 | .962 | .120* | .142 |
| Sex | -.451 | 1.31 | .0521 | .013 |
| Exp | .042 | 1.810 | -.054** | .132 |
| AY | -.016 | .908 | .00114 | .042 |
| HHcom | -.319 | .562 | .0012 | .205 |
| Farm size | .032 | .954 | .0511** | .053 |
| Perception of CSR | 1.418 | 9.134 | .016* | .052 |
| Observation | 800 | | | |
| Likelihood Ratio - LR test ( $\rho$ =0) | $\chi 2 (1) =1247.31$** | | | |
| Pseudo R$^2$ | 0.41 | | | |

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

**Source:** Computed from the field data by authors

Flowing with the likelihood of treatment predicted in the model, the effect of the CSR on alleviating header-farmer conflict is projected by the average treatment effect (ATT) in accordance with equation 4. Having cautiously certified that the observations are ordered arbitrarily and that there are no large variances in the dispersal of propensity scores, the result shows that Nearest

Neighbour Matching (NNM) produces the highest and most noteworthy treatment effect estimated in all the outcome variables.

**Table 6.** Estimated impacts of CSR interventions of the MOCs using GMoU on mitigating header-farmer crisis using different matching algorithms

| Description | Access and Knowledge Score in Percentage of Maximum Score | | Average Treatment effect on the treated |
|---|---|---|---|
| | Receivers | Non- Receivers | |
| **Nearest neighbor matching** | Using single nearest or closest neighbor | | |
| Score on decrease in land dispossession | 27.42 | 19.35 | 8.07** |
| Scores on reduction in growing land pressure | 28.32 | 16.78 | 11.54** |
| Scores on reduction of social inequalities | 20.73 | 14.68 | 6.050** |
| Score on reduction of Conflict of interest and mistrust | 33.08 | 19.56 | 13.52** |
| Scores on reduction in theft of crops and animals | 32.42 | 18.65 | 13.77** |
| Scores on enhanced welfare of the people | 35.62 | 12.34 | 23.28 ** |
| **Observations** | **400** | **400** | |
| **Radius matching** | **Using all neighbors within a caliper of 0.01** | | |
| Score on decrease in land dispossession | 32.14 | 30.12 | 3.02** |
| Scores on reduction in growing land pressure | 41.16 | 32.34 | 8.82** |
| Scores on reduction of social inequalities | 27.41 | 23.13 | 4.28** |
| Score on reduction of Conflict of interest and mistrust | 31.43 | 25.22 | 6.21** |
| Scores on reduction in theft of crops and animals | 20.42 | 25.53 | -5.11 |
| Scores on enhanced welfare of the people | 22.42 | 8.66 | 3.78 |
| **Observations** | **400** | **400** | |
| **Kernel-based matching** | **Using a bi-weight kernel function and a smoothing parameter of 0.06** | | |
| Score on decrease in land dispossession | 32.02 | 21.14 | 10.88** |
| Scores on reduction in growing land pressure | 29.23 | 24.31 | 4.92** |
| Scores on reduction of social inequalities | 26.35 | 23.14 | 3.21** |
| Score on reduction of Conflict of interest and mistrust | 18.33 | 16.44 | 1.89** |
| Scores on reduction in theft of crops and animals | 17.16 | 23.61 | - 6.45* |
| Scores on enhanced welfare of the people | 21.32 | 19.34 | 1.98 |
| **Observations** | **400** | **400** | |

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

**Source:** Computed from the field data by authors

The nearest neighbour matching evaluation of a variable— like decrease in land dispossession due to getting CSR— is approximately 8%. Nevertheless, it appears the nearest neighbor matching method produces relatively not too good matches, thus, we tried the other two matching methods (Radius matching and Kernel-based matching) which produced estimated impact of roughly 3%, and 11% respectively. In this, the Radius matching produced the highest significant average treatment effect on the treatment. For that reason, we can confirm that the CSR of MOCs using the GMoU generate positive significant effect in reducing land scarcity among the respondents. If this activity is reinvigorated and worked upon, header-farmer conflict may eventually be removed. We checked the unevenness of single observable in the third step following our projection in equation 5. In the result, we noted that the quality of kernel-based matching and radius matching is much higher than that of the simple method of deciding on the only closest neighbour in line with the propensity score. The statistics for the overall balance of all covariates between treatment group and control makes certain the higher quality of kernel-based matching and radius matching. Both the mean and the median of the absolute standardized variance after matching are below the threshold of 5%.

Lastly, in line with equation 7 above, sensitivity of significance levels was looked at having in mind that it is the task of a fitting control strategy for hidden bias. The study thus made a comparison of the sensitivity of treatment effects on scores of the core variables of decrease in land dispossession, decrease in growing land pressure, reduction of social dissimilarities, reduction of conflict of interest and mistrust, reduction in the stealing of crops and animals, and improved welfare of the people -- among the three presented matching algorithms. Generally, we noted that the sturdiness of the results fashioned by Rosenbaum's bounds are very closely similar.

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

| Covariates $X$ | Standardized differences in % after | | |
| --- | --- | --- | --- |
| | Nearest neighbor matching | Radius matching | Kernel-based Matching |
| Constant | 41.6 | 2.8 | 4.7 |
| *MS* | 21.5 | 4.9 | 2.6 |
| *Edu* | 31.4 | 6.4 | 8.8 |
| *AY* | 9.5 | 3.8 | 2.1 |
| *PriOcc* | 11.6 | 5.3 | 3.4 |
| *Exp* | 31.4 | 2.4 | 4.3 |
| *Age* | 15.7 | 3.3 | 2.1 |
| *Farm size* | 12.6 | 2.7 | 0.5 |
| *Sex* | 22.5 | 4.1 | 1.9 |
| *Perception of GMOU* | 86.4 | 5.5 | 6.3 |
| *HHcom* | 19.4 | 5.4 | 2.1 |
| Mean absolute standardized difference | 27.60 | 4.24 | 3.53 |
| Median absolute standardized difference | 19.4 | 4.1 | 3.4 |

**Source:** Computed from the field data by authors

Analysis (Table 8) displays that treatment effect produced by using Kernel-based Matching (KM) in respect to estimates to hidden bias is healthier than the one generated from Radius Matching (RM) and nearest neighbour matching, for the six variables of measurement (reduction in land dispossession, decline in growing land pressure, reduction of social inequalities, reduction of conflict of interest and mistrust, reduction in stealing of crops and animals, and improved welfare of the people). There is a likelihood that matched pairs may vary by up to 100% in unobservable features; while the effect of CSR on drop in land dispossession, decline in growing land pressure, reduction of social inequalities, reduction of conflict of interest and mistrust, reduction in stealing of crops and animals, and improved welfare of the people all would still be significant at a level of 5% (*p*-value = 0.0218 and *p*-value = 0.012, *p*-value = 0.0114, *p*-value = 0.034, *p*-value = 0.0432, and *p*-value =

0.0134, respectively). The same categories of knowledge score are robust to hidden bias up to an effect of $e^\gamma = 2$ at a significance level of 10% following the radius matching method.

Table 8. Sensitivity analysis with Rosenbaum's bounds on probability values.

| | Upper bounds on the significance level for different values of $e^y$ | | | | |
|---|---|---|---|---|---|
| | $e^y = 1$ | $e^y = 1.25$ | $e^y = 1.5$ | $e^y = 1.75$ | $e^y = 2$ |
| **Nearest neighbor matching** | Using single nearest or closest neighbor | | | | |
| Score on decrease in land dispossession | 0.0001 | 0.0223 | 0.0231 | 0.0241 | 0.0411 |
| Scores on reduction in growing land pressure | 0.0001 | 0.0012 | 0.0321 | 0.231 | 0.621 |
| Scores on reduction of social inequalities | 0.0001 | 0.0041 | 0.0634 | 0.418 | 0.871 |
| Score on reduction of Conflict of interest and mistrust | 0.0001 | 0.0021 | 0.0031 | 0.0521 | 0.143 |
| Scores on reduction in theft of crops and animals | 0.0001 | 0.0017 | 0.0012 | 0.2121 | 0.2101 |
| Scores on enhanced welfare of the people | 0.0001 | 0.0016 | 0.0021 | 0.321 | 0.211 |
| **Radius matching** | Using all neighbors within a caliper of 0.01 | | | | |
| Score on improvement of land dispossession | 0.0001 | 0.0015 | 0.002 | 0.0312 | 0.0732 |
| Scores on reduction in growing land pressure | 0.0001 | 0.0018 | 0.0021 | 0.141 | 0.026 |
| Scores on reduction of social inequalities | 0.0001 | 0.0011 | 0.0031 | 0.121 | 0.036 |
| Score on reduction of Conflict of interest and mistrust | 0.0001 | 0.0002 | 0.0009 | 0.0081 | 0.0436 |
| Scores on reduction in theft of crops and animals | 0.0002 | 0.0012 | 0.0032 | 0.021 | 0.0731 |
| Scores on enhanced welfare of the people | 0.0004 | 0.0214 | 0.1634 | 0.628 | 0.091 |
| **Kernel-based matching** | Using a bi-weight kernel function and a smoothing parameter of 0.06 | | | | |
| Score on improvement of land dispossession | 0.0001 | 0.0011 | 0.0001 | 0.005 | 0.0218 |
| Scores on reduction in growing land pressure | 0.0001 | 0.0071 | 0.0231 | 0.213 | 0.012 |
| Scores on reduction of social inequalities | 0.0001 | 0.0016 | 0.0012 | 0.0026 | 0.0114 |
| Score on reduction of Conflict of interest and mistrust | 0.0001 | 0.0184 | 0.164 | 0.485 | 0.034 |
| Scores on reduction in theft of crops and animals | 0.0001 | 0.0315 | 0.012 | 0.0421 | 0.0432 |
| Scores on enhanced welfare of the people | 0.0001 | 0.0015 | 0.0013 | 0.0021 | 0.0134 |

**Source:** Computed from the field data by authors

Overall, the result of this study tally with Brottem (2021), in that views of social disparity also affect relationships within communities where local elites, usually clan elders or family (household) helps,

possess notable economic and social power over their subordinate. In Niger Delta expanse of Nigeria, this ranked community structure is codified within a "neofeudal" caste system and has purportedly added to complaints among youth and lower caste, which militants' groups take advantage of to foster recruitment. Pastoralist -- allied armed groups in the region -- gain influence by defending herders during the conflicts, which afterwards lead to violence and struggle between the groups and the traditional community's established order. The outcomes also agree with Moritz (2006), in that as soon as mistrust, rumor, and suspicion taint views of the dispute settlement process, the upset parties and their allies are often quick to assume that corruption will run things. For any reason, if either party to a dispute discards the contribution of authorities, clashes may escalate into inter communal standoffs that are quick to turn very destructive. Furthermore, the result of this study agrees with the frustration-aggression theory as it puts forward to scholars and researchers of human nature that when they observe aggression, they should turn a suspicious eye on likelihoods of the organism or group being faced with frustration; and that when they view meddling with individual or group habits such as herder-farmer conflict, what should be in the pipeline, among other things, is aggression. As it concerns Niger Delta, herder-farmer violence is seen as being caused by frustration in the environmental injustice caused by oil mining activities, as local communities are prohibited from reaching their goals and objectives in life. The outcomes put forward that the relative priorities of MOCs' CSR undertakings in the Niger Delta should vary from the classic, American ordering, as proposed by Carroll (1991). Placing value on the cultural context in the determination of apposite CSR priorities and programmes, as suggested by Visser (2006), is essential in the context of rural Niger Delta. However, in addition and input, if we are to have a say on how CSR interventions can bring down the main drivers and prompters of herder-farmer violence in the Niger Delta, we would maintain that MOCs' CSR can play a vital role in lessening the main drivers and triggers of herder-farmer clashes when investment in growing land pressure, land dispossessions, social disparities,

stealing of livestock (theft), and conflict of interest cum mistrust is designed for the intricacies of real life in the region. Admitting the web of problems in the growing intricacy of herder-farmer conflict in the Niger Delta, it is our argument that the private sector, generally, is well placed to help resolve some of the logistical, environmental cum social problems that trigger herder-farmer violence in the region. MOCs, specifically, are in a good position to help resolve the drivers and triggers of farmer-herder violence, invest political capital as well as financial resources to better land management infrastructure, train local leaders in conflict (dispute) resolution methods, and place value on building trust between communities and the security forces. Thus, taking on increased CSR investment in herder-farmer conflict project, should form the basis for GMoU practice in the Niger Delta, which in turn will create an encouraging ground for extensive accountable businesses to thrive in sub-Saharan Africa.

## 5. Concluding remarks, caveats and future research directions

The recent clashes between herders and farmers in the Niger Delta expanse of Nigeria point out important changes in the context and dynamics of the protracted conflict. The conflict is progressing from spontaneous clashes to calculated attack including targeted killings, destruction of properties, and law-breaking activities like kidnapping for ransom. If not alleviated, the conflict could build up and take on dangerous ethnic, religious, and criminal magnitudes. This could unfavorably impact the dynamics of insecurity in the oil producing region, with substantial socio-economic, political and security concerns in Nigeria. Thus, we set out to ascertain the impact of the new MOCs' CSR model (GMoUs) on bringing down the main drivers and triggers of herder-farmer violence in the Niger Delta expanse of Nigeria. Both expressive and inferential statistics were put to use to answer the research questions. Primary data were gathered from a sample of 800 respondents picked form the states in the Niger Delta, using multiple sampling techniques. Findings from the use of both

propensity score matching and logit model reveal that though, a very paltry measure of the CSR undertakings are targeted specifically at alleviating herder-farmer conflict, the CSR of the MOCs using the GMoU model has contributed in lessening land dispossession, cutting social disparities, bringing down growing land pressure and improving welfare of the people in the Niger Delta expanse. The result suggests that MOCs are well placed to help resolve the drivers and triggers of farmer-herder violence; put in money (political capital and financial resources) to better land management infrastructure, train local leaders in methods for the resolution of conflicts, and place value on building trust between communities and the security forces. Hence, taking on increased CSR investment in herder-farmer conflict project, should form the basis for GMoU practice in the Niger Delta, which in turn will create room to enable extensive responsible businesses to thrive in sub-Saharan Africa. However, the main constraint of this study is that, it is limited to the scope of oil producing communities in Nigeria. As a result, the outcomes of the study cannot be generalized to other evolving countries that are threatened by similar policy issues. Hence, reproducing the analysis in other emerging nations is advisable in other to ascertain if the established nexus of this study withstand empirical scrutiny in changing context of rising regions.

## Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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