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Assessment of the Prospect of Cooperative Effect on Welfare of Sand Miners Association of Anambra and Delta States [SMAADS] of Nigeria

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ABSTRACT

The study on assessment of the prospect of cooperative effect on the welfare of sand miners association of Anambra and Delta States [SMAADS] of Nigeria had four specific objectives which were to ascertain the extent to which access to cooperative credit facilities can alleviate the poverty level of Sand Mining Association (SMAADS) members in Anambra and Delta States, ascertain the extent to which controlled supply and price regulations of sands can enhance the profitability of members, assess the influence of (SMAADS) members education, and training information on members literacy level, and evaluate the SMAADS corporate social responsibilities that can facilitate the cooperative principle of concern for the environment of the host community in Anambra and Delta States. Data were collected with a well-structured questionnaire from a cross-section of randomly selected 451 (234 – Anambra and 217 – Delta) members of Sand Miners Association (SMAADS). The data were analyzed with a combination of analytical tools such as descriptive statistics, mean threshold from 5 points Likert Scale, multiple regression and other inferential statistics such as Z-test and Wilcox sign test. The study found the average amount of credit accessed are 769,921.91(Anambra) and 539,454.22 (Delta). The extent to which access to cooperative credit facilities alleviate the poverty level of the sand mining association members had a grand mean score of 2.58 (Anambra) and 3.51 (Delta) and was significant at a 1% level of probability (3.69***). Controlled supply and price regulations enhanced profitability with a grand mean of 3.03 (Anambra) and 3.34 (Delta), while the profitability itself had a grand mean of 2.97 (Anambra) and 3.27 (Delta). The study equally revealed that the extent to which education and training influenced the literacy level of members of the association was significant 19.21*** (Anambra) and 37.70*** (Delta) at a 1% level of probability. It is important to bring to the readers notice that the amount of cooperative credit accessed differs significantly (6.86***) in the two-state. Furthermore, members concern for the environment of the host community was significant in Anambra (9.67***) and Delta (8.84***) at a 1% level of probability. The study recommends among others that the sand miners should organize themselves into a cooperative association to improve their performance while still trying to enforce the supply and price regulations services of the association in the study area.

KEYWORDS: *Cooperative Effect, Welfare, Sand Miners Association*

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1. INTRODUCTION

Nigeria's abundant solid minerals are made up of precious stones, metals, industrial minerals like coal, tin, gold, marble and others. The core of these mineral deposits scattered across the country remains a major attraction for informal conventional running activities, even though they are yet to be fully exploited on a large scale (Nwadi, 2013). Along economic lines, the mining sector in Nigeria has been touted as a potential player, a country where the government still holds all mineral rights. Many have noted that a sustained solid minerals industry provides a pathway for rapid development of Nigeria through the generation of employment and improve national income earning at levels higher than the petroleum industry. The mining sector has been experiencing an ongoing resurgence with growing prospects. The physical inventory for sand mining estimated at over 1,639mt, the sector produced 200 billion tons per annum serves as a testament to the vast potentials at Nigeria' solid mineral deposits and 1,254,200 rural-based jobs from over 1,710 quarries with accrued monetary benefits. Surely, these are damaging environmental effects. The unique characteristic of cooperatives is that most of the demand for their services comes from their members. This member-driven orientation makes the cooperative enterprise different and to make such enterprise desirable, members must realize enough benefits from their cooperatives to compensate for their financial and time commitment (Onyima, 2009). (Nwaoke, 2005) asserted that cooperative effect among other things entails the degree of extra satisfaction which a member derives or benefits as a result of participating or forming a cooperative as compared to working alone. In other words, cooperative effects cover the wide range of socio-cultural and economic advantages that people gain when they acquire the membership status of a cooperative society.

Sand business is a cool and rewarding venture, it is a crucial component for road construction and building houses, though other items such as cement, roofing sheets, paints among others are also essential and are needed to hold together the structure. It is this realization that has nudged some people in the direction of setting up cottage firms to dredge rivers, lagoons and streams for sand sales. Sands come in different colour sand uses, some are for moulding blocks, some are for plastering, and others are for road constructions sold to different categories of users and because of the huge profit involved, these sand dealers go out of their way to procure sand from anywhere including canals, rivers and even road sides. It is a thriving business that is making dealers smile at the bank (Vanguard 7 Aug, 2016). The prospect of co-operative effect on the welfare of small holder sand miners should not be overemphasized, looking at the benefits to both micro and macro enterprises that include self-reliance, agent of technology transfer, agent of credit mobilizations, agent of developing small scale industrial clusters, mass mobilization and public enlightenment, agent of women empowerment and rural development. Sand mining activities are done inside the River Niger areas in both Anambra and Delta States of Nigeria under the supervision of the Ministry of Mines, and the Ministry of Transport who owns the dump site situated at the banks of the River Niger. Sand miners in Anambra and Delta States have a very viable and strong union known as Sand Miners Association ofAnambra & Delta States with membership strength of 451. The union members operate practically by using dredging boats that ferry the sand from the mining or dredging point to the dump site by the bank of the river. A hundred meters from all the river banks are owned by National Inland Water Ways Authority (NIWA) who controls the dredging activities among smallholder sand miners in both Anambra & Delta States. Smallholder sand mining is fast becoming one of the emergent industries in Nigeria.

It is also becoming useful for private sector real estate development through the demand for sand. It is widely agreed that one of the most basic needs of man is shelter and in modern-day history, the use of cement along with sand and gravel has come to be accepted as one of the best construction raw materials because they provide durability, firmness and can withstand harsh weather condition though other materials like steel and glass are also used. Sand mining and dredging are critical to infrastructural development in Nigeria. It is used in the manufacturing of abrasives, concrete and is mixed with salt to use on icy roads. Sand dredging can extract various minerals that contain useful elements like titanium. Sand mining can also be used in the replacement of eroded coastline. The advent of sand mining in Anambra State as well as Delta State started in the late 80s at the bank of River Niger. It is done manually with canoe and head pans. The Chairman Bridge Head Unit SMAADS, during an interview said it started with divers that dive inside the river Niger and scoop sands using head pans into a canoe and when full, ferried it to the bank of the river and the sands are discharged at the bank of the river and loaders load the sand to waiting trucks known as tippers. This manual system continued till early 2000 when an entrepreneur The Chairman of Ose Unit and the pioneer President of Sand Miners

Association then only in Anambra State, brought in dredging engineers from China that constructed a movable or mobile dredger that was mechanically constructed aided by a tog boat that togs it to the loading point in the middle of the River and back after loading for discharge at the bank of the River. Sand business in Anambra and Delta States has an existing union and structures. The union known as Sand Miners Association of Anambra and Delta States (SMAADS) has members who are into the sand mining and sales business. The union was founded in 2018 with Chief Sir Chris Mbaegbu as the Pioneer President. The union is fully registered with Corporate Affairs Commission (CAC). The activities of sand miners in Anambra and Delta States is compatible with corporative practices hence the need for a study on the prospect of transforming SMAADS into a primary and secondary cooperative that will be beneficial to members. Against this backdrop, the study assesses the prospect of cooperative effect on the welfare of sand miners association of Anambra and Delta States.

Statement of the Problem

Sand has been used in the construction of roads, dams, schools, health facilities and houses for many years. The increasing population and economic developments generally impose an ever-increasing rise in the demand for sand throughout the world (Anosike and Oyebade, 2012). Sand mining activities are mostly deemed to be unsustainable not only because they explore resources but because they destroy the environment and leave irreversible impacts. Sand is an important mineral for our society in protecting the environment, but the practice of sand mining is becoming an environmental issue as the demand for sand increases in industry and construction which can lead to clearing of vegetation, erosion and landslide. Sand mining as a commercial activity has continued to be an economic activity for the rapidly growing population in urban areas and has contributed to the unprecedented demand for sand to meet the ever-rising needs of the building and construction industries. However, Adebayo and Abioye (2006) emphasizes the reluctance of banks to issue credit facilities to cooperatives and this left the choice of formal organizations like cooperative societies to issue a credit to its members. Sand Miners Association of Anambra and Delta States [SMAADS] has a lot of challenges ranging from price control, and other felt needs which include: how to finance their business better; how to manage their business to get better results; how to effectively form a co-operative enterprise, how to protect their business from invasion by government agencies on revenue, and youths of the community, education of its members, and marketing of their products.

These form a strong felt need enough to bring them together as cooperatives. Finance is a major challenge facing the Sand Miners Association of Anambra & Delta States. This consist of the acquisition of dump site, letter of authority from the host communities, construction of dredging boat and its tog boat, procurement of mining license and employment of reputable staff and good management. The formation of cooperative among small holder sand miners will assist the members in their mining activities and credit facilities will help to facilitate their growth and development in their mining business. Thus, the study investigates and assesses the prospect of cooperative effect on the welfare of Sand Miners Association in Anambra and Delta States of Nigeria to be compatible with the ideals of cooperatives practices. There is limited research undertaken in the sector of sand mining cooperatives in Nigeria hence the more reason why this study was necessary and this gap prompted the study. Towards this, the challenges of this study are to attempt to address the understated objectives.

Objectives of the Study

The broad objective of this study is to assess the potentials of the cooperative effect on the welfare of the Sand Miners Association [SMAADS] in Anambra and Delta States of Nigeria. This study is specifically designed to:

1. Examine the effect of access to cooperative credit facilities on alleviating the poverty level of Sand Mining Association members in Anambra and Delta States.
2. Ascertain the effect of controlled supply and price regulations of sand on the profitability of members of sand miners association in Anambra and Delta State.
3. Assess the influence of members' education, training and information on members' literacy and development level in Anambra and Delta States.
4. Examine the effect of Sand Miners' corporate social responsibilities on facilitating concern for the environment of the host community in Anambra and Delta States.

Research Hypotheses

H_{o1}: There is no significant effect of access to cooperative credit facilities on alleviating the poverty level of Sand Mining Association members in Anambra and Delta States.

H_{o2}: There is no significant effect of controlled supply and price regulations of sand on the

profitability of members of the sand miners association in Anambra and Delta State.

H_{o3}: Members' education, training and information do not influence members' literacy and development level in Anambra and Delta States.

H_{o4}: Sand Miners' corporate social responsibilities facilitate does not concern for the environment of the host community in Anambra and Delta States.

2. METHODOLOGY

Research design

The study adopts a mixed research approach, which is a combination of both Qualitative and Quantitative research. The quantitative perspective involved the use of an analytical survey research design. Analytical surveys (also termed cross-sectional studies) are carried out to investigate how a response variable is related to a particular explanatory variable(s). The qualitative approach involved the conduct of interviews with key executives of the Sand Miners in Anambra and Delta States. Both designs employed the use of a well-structured questionnaire and face to face interviews, to elicit information from the respondents, the study focused on people, their opinions, motives and behaviour. The survey research, the study involved the assessment of the prospects of cooperative effects on the welfare of sand miners in Anambra and Delta states of Nigeria. To make the study more purposeful and research-oriented, the research was carried out on the entire sand miners unit in both Anambra and Delta States. Anambra State has 12 units with 234 members, while Delta State has 18 units with 217 members.

Area of Study

The research was carried out in both Anambra and Delta State of Nigeria.Anambra State, formally east-central Nigeria was first formed in 1976 from the northern half of the east-central state of Nigeria, in 1991, it was considerably reduced in area by an administrative reorganization that created the new state of Enugu. Anambra state known as the light of the Nation has a population of 4,055, 043 (NPC, 2006) with Awka as the state capital. It has an area of 4,416sq km. It is boarded by the states of Kogi on the north, Enugu on the east, Abia on the south, Imo and Edo on the west. It includes the valley of the lower Anambra a river which is a tributary of the Niger river, It hosts the largest market in West Africa, Onitsha main market: Anambra State has 21 local governments areas. Igbos constitute the majority of the population with 98% and Igala 2%, A major bridge across the Niger river at Onitsha provides a direct road link westward to Benin city and Lagos state. Leads, zinc, ignite and sand are mined in the southern part of the state, The sand miners in Anambra State are located at the banks of the River Niger and they have 12 Units and one hundred and forty-one beaches as their dumpsites and the sites are demarcated with concrete, planks, boards and sandbags.

Delta state is in southern Nigeria, it is bounded by Edo state in the north, Anambra state in the east, Rivers state in the south-east, Bayelsa state in the south, the bright of Benin of the Atlantic Ocean to the west and Ondo state to the north. Delta state was created in 1991 from the southern part of the former Bendel State. Asaba is the state capital. The state is inhabited by the Igbos in the east, Edo in the north, and the Itsekiri, Urhobo, Isoko and Ijo in the south and west. It is an oil and agricultural producing state in Nigeria. Delta state is the major exporter of petroleum, rubber, timber, palm oil and kernel via the Niger delta ports of Burutu, Forcadoes, Koko, Warri, and Sapele. A bridge crosses the Niger River from Asaba to Onitsha. It is situated at the region known as South-South geo-political zone with a population of 4,112,445 (male: 2, 069,309, female; 2,043,136). Delta state sand miners have 18 Units and two hundred and two beaches as their dumpsite situate at the bank of River Niger.

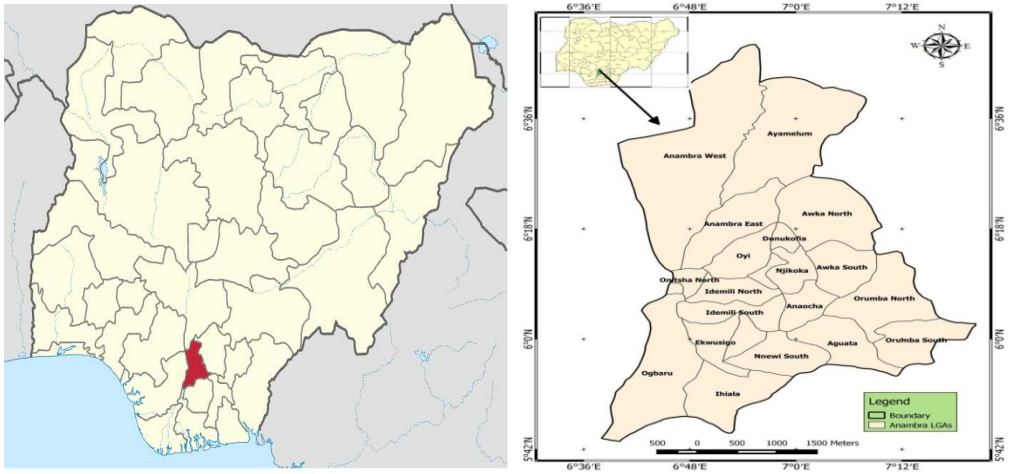

Figure 3.1: Map of Nigeria Showing Anambra State and Its Local Governments

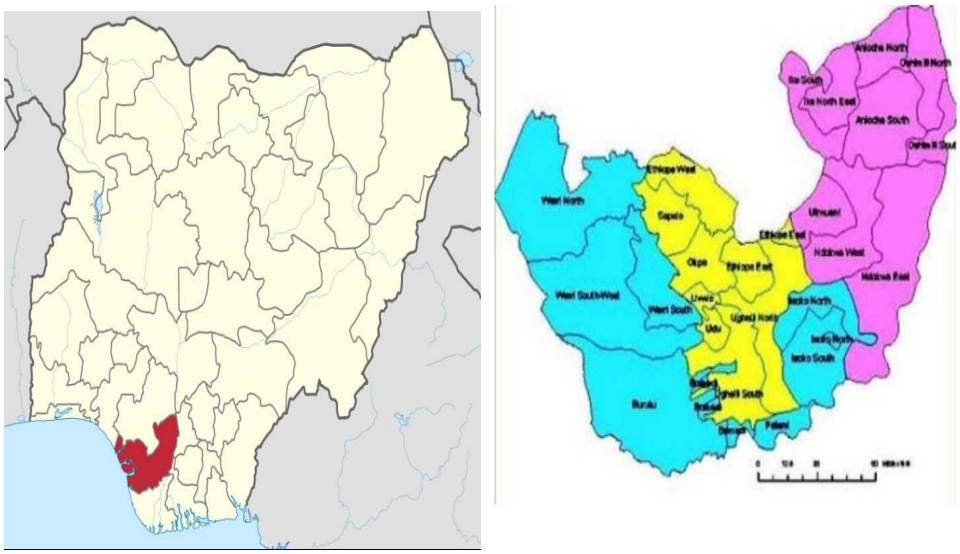

Figure 3.2: Map of Nigeria Showing Delta State and its Local Governments

Population of the Study

The population of the study is made up of all the members of the sand miners Association of Anambra & Delta States (SMAADS). This is a finite population and since the membership size is known 451 comprises the union members and their leaders (Union Register, 2021).

Sampling Size and Sampling Technique

Since the population is finite and small in coverage the researcher will use complete enumeration of the population both the members and their leaders which is 451.

Anambra State has a total of 21 L.G.A and the sand miners association units are:

1. Anambra East L.G.A
A. Nsugbe Unit – 24 members
B. Nneyi Unit – 16 members

2. Anambra North L.G.A
A. Aguleri Unit – 23 members

3. Awka North L.G.A
A. Ezu Unit – 15 members
B. Ngwu Nzu Unit – 12 members

4. Ogbaru L.G.A.
A. Idemili Unit – 21 members
B. Atani Unit – 20 members
C. Ukwu akpu unit – 12 members
D. Ochuche Unit – 11 members

5. Onitsha North L.G.A
A. Marine Unit – 22 members

6. Onitsha South L.G.A
A. BridgeHead Unit - 28 members
B. Ose Unit. – 30 members

Anambra state SMAADs has a total of 234 members

Delta State has a total of 25 L.G.A and the sand miners association units are:

1. Ahoada West L.G.A -
A. Mbiama Unit – 7 members

2. Aniocha L.G.A.
A. Otu ogbu Unit – 12 members
B. Ella Unit – 15 members

3. Ethiope West L.G.A.
A. Elenchere Unit – 5 members

4. Ndolawa West L.G.A.
A. Kwale Unit – 16 members
B. Abor Unit – 6 members

5. Oshimili South L.G.A
A. Anwai Unit – 8 members
B. John Holt Unit – 16 members
C. Marine Unit – 10 members
D. Ogbe Ofuu Unit – 8 members
E. BridgeHead(Asaba) Unit – 23 members
F. Power line Unit – 8 members
G. Miles 5 Unit – 11 members

6. Ugheli North L.G.A
A. Ugheli Unit – 1 member
B. Okoh Unit–9 members

7. Ukwuaani L.G.A
A. Doumbia Beach- 5 members

8. Warri South L.G.A
A. Warri Beach Unit – 29 members
B. Patani Beach Unit – 18 members

Delta state SMAADs has a total of 217 members

Methods of Data Analysis

A combination of analytical tools was adopted in this study, the statistical tools used include descriptive statistics, mean threshold from 5 points Likert Scale, multiple regression model factor analysis and other inferential statistics. Objectives one and two was achieved using descriptive statistics which includes tables, mean, percentage and charts. Objectives three and four was achieved using the mean threshold of 5 points Likert Scale, also objective three was achieved with principal factor analysis, the null hypothesis one was tested from the ratio of multiple regression analysis. Equally, null hypothesis two was tested with a sign test of a non-parametric tool.

The mean threshold of 5 points Likert scale is defined by;

$$x = \frac{SA+A+SHA+D+SD}{5} = 3.0$$

Where

SA (5)	=	Strongly Agreed
A (4)	=	Agreed
SHA (3)	=	Somehow Agreed
D (2)	=	Disagreed
SD (1)	=	Strongly Disagreed

The data were analyzed with a combination of analytical tools such as descriptive statistics, mean threshold from 5 points Likert Scale, multiple regression and other inferential statistics such as Z-test and Wilcox sign test.

Model Specification

The following models were employed to analyse and test the hypotheses formulated in the study, as follows:

1. For Hypothesis One: The Z test statistic is as follows $\mathbf{z = (x-\mu)/\sigma}$

Where:
x is the raw score,
μ is the population mean, and
σ is the population standard deviation.

2. For Hypothesis Two: The OLS model is specified as

$Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon_i$

Where:
Y_1 Controlled Supply

X_1 Administrative requirements required prior to start-up
X_2 Administrative limits on daily supply output
X_3 Price fixing regulations
X_4 Setting benchmark price and price monitoring
X_5 Enhanced sustainable market development

3. For Hypothesis Three: The OLS model is specified as

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon_i$$

Where:
Y_1 Literacy and Development Level
X_1 Education and business management skills
X_2 Training and capacity development
X_3 Cooperative training and mutual cooperation
X_4 Training and risk management

The OLS linear models were checked using the exponential, log, semi-log and double log and the best equation selected based on the model with highest R^2 values, highest F- statistics and in conformity with the apriori expectation.

4. For Hypothesis Four: The Wilcox Sign Rank Test is specified as:

$$Z = \frac{Ws - \frac{n(n+1)}{4}}{\left(\sqrt{\frac{n(n+1)(2n+1)}{24}}\right)}$$

Where:
n = number of pairs where difference is not 0
Ws= smallest of absolute values of the sums

3. RESULTS AND DISCUSSIONS

Socioeconomic Characteristics of the Sand Miners

The socioeconomic characteristics of Sand Miners (SMs) in the study area are presented in table 1. The results of the two States (Anambra and Delta) are presented side by side. The socioeconomic characteristics are discussed thus:

Table 1a: Socioeconomic characteristics of the sand miners

Sr.	Variables	Anambra		Delta	
		Frequency	%	Frequency	%
1	**Age:**				
	≤ 30	72	30.8	82	37.8
	31 - 50	80	34.2	83	38.2
	51 - 70	82	35.0	52	24.0
2	**Sex:**				
	Female	87	37.2	70	32.3
	Male	147	62.8	147	67.7
3	**Marital status:**				
	Single	58	24.8	32	14.7
	Married	104	44.4	120	55.3
	Widow/er	52	22.2	49	22.6
	Divorced/separated	20	8.5	16	7.4
4	**Education:**				
	No formal Education	6	2.6	13	6.0
	Primary	58	24.8	61	28.1
	Secondary	118	50.4	104	47.9
	Tertiary	41	17.5	36	16.6
	Post-graduate	11	4.7	3	1.4

5	**Union membership:**				
	10 – 40	57	24.4	100	46.1
	41 – 80	119	50.9	64	29.5
	81 and above	58	24.8	53	24.4
6	**Primary occupation:**				
	Owner managed	87	37.2	55	25.3
	Beach manager	51	21.8	52	24.3
	Apprentice manager	65	27.8	56	25.8
	Partnership	31	13.2	54	24.9
7	**Secondary occupation:**				
	Civil servant	43	18.4	40	18.4
	Trader	82	35.0	30	13.8
	Artisan	61	26.1	73	33.6
	Farmer	11	4.7	32	14.7
	Pensioner	37	15.8	42	19.4

Source: Field Survey Data, 2021.

Age: The study revealed that a greater proportion (34.2%) SMs age in Anambra State falls within the range of 51 – 70 years, while the remaining falls within 31 – 50 years (34.2%) and ≤ 30 years (30.8%). On the other hand, the greater proportion of the SM's age fall between 31 – 50 years, while the remaining fall within ≤ 30 years (37.8%) and 51 – 70 years (24.0%). The average age for the SMs from the two States is 42.73 (Anambra) and 39.76 (Delta). The implication is that SMs from Delta state are younger than those from Anambra state. Generally, the SMs representing the study are young and in their active age. At this age, researchers like Uchemba, Nenna and Obianefo (2021) allude that at this age adoption of improved technology is possible to improve the economic status of the people.

Sex: The study found that the majority (62.8% - Anambra) and (67.7% - Delta) of the SMs in the study area are male, while the remaining 37.2% (Anambra) and 32.3% (Delta) are female. Since the mode is male; the implication is that male SMs dominates the enterprise in the study area. This result was expected because the enterprise requires more physicality and masculinity.

Marital status: The table reflects the marital status of the study respondents; it was found that a greater proportion (44.4%) of the SMs in Anambra state and more than half (55.3&) of them in Delta are married, while the remaining in Anambra are single (24.8%), widows & widowers (22.2%), but 8.5% of them are separated. In Delta, the study revealed that the remaining are equally widows & widowers (22.6%), single (14.7%) and separated (7.4%). The SMs owners are young, they are also married which could mean that the enterprise is lucrative enough to cater for their household livelihoods.

Level of education: Based on the level of education of the SMs, the study revealed that about half (50.4%) of the respondents in Anambra and greater proportion (47.9%) in Delta state attended secondary school, the remaining SMs in Anambra attended primary (24.8%), tertiary (17.5%) and post-graduate (4.7%). Also, the remaining SMs in Delta attended primary (28.1%), tertiary (16.6%) and post-graduate (1.4%). 2.6% (Anambra) and 6.0% (Delta) had no formal education. The study equally revealed that the average years the SMs spent in formal education was 12.92 (Anambra) and 9.38 (Delta). This has confirmed that the SMs from the two States attempted secondary school. The SMs information on education is very impressive being that it will help them to understand basic operational principles of cooperation to improve their performance.

Union membership: The study found that the union membership size of the SMs is large since about half (50.9%) of their union in Anambra state has 41 – 80 membership, while the remaining has 81 and above (24.8%) and 10 – 40 (24.4%) members. In Delta state, a greater proportion (46.1%) has a membership strength of 10 – 40 persons, while the remaining have 41 – 80 (29.5%) and 81 and above (24.4%). Management of large union membership will pose a serious problem which suggests while these groups should be mobilized into a registered cooperative society. The cooperative structure is already there and should be built on for the SMs to upscale their operations.

Primary occupation: In Anambra, a greater proportion (37.2%) of the SMs manage their own sand business, while the remaining are apprentice managers (27.8%), beach managers (21.8%) and are in partnership (13.2%). Also, in Delta; a greater proportion (25.8%) of the SMs are apprentice managers, while the remaining are managers of their own business (25.3%), in partnership (24.9%) and beach managers (24.3%).

Secondary occupation: Based on secondary occupation, the table shows that in Anambra state, a greater proportion (35.0%) of the SMs are traders, while the remaining secondary occupation is artisans (26.1%), civil servant (18.4%), pensioners (15.8%) and farmers (4.7%). In Delta state, the greater proportion (33.6%) of the SM's secondary occupation was artisans, while the remaining are pensioners (19.4%), civil servants (18.4%), farmers (14.7%), and traders (13.8%). This finding revealed that the SMs have other sources of income to supplement their business in case of any hard times in the sand business.

Table 1b: Socioeconomic characteristics of the sand miners continued

Sr.	Variables	Anambra		Delta	
		Frequency	%	Frequency	%
8	**Family size:**				
	1 – 3	33	14.1	69	31.8
	4 – 6	97	41.5	80	36.9
	7 and above	104	44.4	68	31.3
9	**Sand mining experience (Yr)**				
	1 – 3	47	20.1	32	14.7
	4 – 6	82	35.0	84	38.7
	7 and above	105	44.9	101	46.5
10	**Annual income (₦)**				
	≤ 200,000	6	2.6	5	2.3
	200,001 – 600,000	13	5.6	21	9.7
	600,001 – 1100,000	18	7.7	21	9.7
	1,100,001 and above	197	84.2	170	78.3
11	**Annual savings (₦)**				
	≤ 100,000	12	5.1	16	7.4
	100,001 – 300,000	45	19.2	59	27.2
	300,001 – 600,000	66	28.2	90	41.5
	600,001 and above	111	47.4	52	24.0
12	**Credit facility:**				
	≤ 100,000	12	5.1	14	6.5
	100,001 – 300,000	29	12.4	40	18.4
	300,001 – 600,000	48	20.5	68	31.3
	600,001 and above	145	62.0	95	43.8

Source: Field Survey Data, 2021.

Family size: The study found that a greater proportion (44.4% - Anambra) and (36.9% - Delta) of the SMs have a family or household size of 7 people and above (Anambra) and 4 – 6 people (Delta), while the remaining SMs in Anambra have a family size of 4 – 6 people (41.5%) and 1 – 3 people (14.1%). Furthermore, in Delta, the remaining SMs have 1 – 3 people (31.8%), and 7 people and above (31.3%). The average family size was found as 6.21 (Anambra) and 4.90 (Delta). The implication is that SMs in Anambra state has more family size than their Delta counterpart or colleagues. The large household size in Anambra is capable of supplying cheap household labour since family members maybe engaged to handle some activities within the Sand mining business.

Sand mining experience: The study revealed that a greater proportion (44.9% - Anambra) and 46.5% - Delta) had 7 years and above sand mining experience, the remaining have 4 – 6 years (35.0% - Anambra & 38.7% - Delta), and 1 – 3 years (20.1 – Anambra & 14.7 – Delta). The average mining experience was found as 6.53 (Anambra) and 6.35 (Delta). These findings have shown that sand mining activities started average at the same time in Anambra ad Delta State respectively.

Annual income (₦): The majority (84.2% - Anambra) and (78.3% - Delta) of the SMs had annual income of 1,100,001 and above, while the remaining had annual income of 600,001 – 1100,000 (7.7% - Anambra & 9.7% - Delta), 200,001 – 600,000 (5.6% - Anambra & 9.7% - Delta) and ≤ 200,000 (2.6% - Anambra & 2.3% - Delta). The average income was found as 2,905,918.19 (Anambra) and 2,345,936.66 (Delta). From the records, it has been proven that sand mining enterprise is a lucrative economic activity whose potentials are not fully tapped.

Annual savings (₦): The researcher discovered that greater proportion (47.4% - Anambra) and (41.5% - Delta) of the SM's annual savings ranges from 600,001 and above (Anambra) & 300,001 – 600,000 (Delta). The

remaining annual savings ranges in Anambra from 300,001 – 600,000 (28.2%), 100,001 – 300,000 (19.2%) and ≤ 100,000 (5.1%). On the other hand, it ranges in Delta from 100,001 – 300,000 (27.2%), 600,001 & above (24.0%), and ≤ 100,000 (7.4%). The mean annual savings was found as ₦552,518.97 (Anambra) and ₦407,416.99 (Delta). The volume of SM's savings is encouraging and it's a good fate to the union survival in they are organized into legal cooperative society.

Credit facility: The socioeconomic characteristics of the SMs, the study tried to investigate the miner's access to credit facility. It was discovered that majority (62.0% - Anambra) and greater proportion (43.8% - Delta) accessed 600,001 and above, while the remaining accessed 300,001 – 600,000 (20.5% - Anambra & 31.3% - Delta), 100,001 – 300,000 (12.4% - Anambra & 18.4% - Delta) and ≤ 100,000 (5.1% - Anambra & 6.5% - Delta). The average credit accessed was found as 769,921.91 (Anambra) and 539,454.22 (Delta). The SMs have adequate access to loan which can help them to expand or upscale their scope of operation.

Test of Hypotheses

Hypothesis One

The hull hypothesis one (Ho_1) that assumed no significant difference in cooperative credit facilities accessed by the SMs in the study area was tested with a Z-test inferential tool. The study found a mean credit of ₦769921.91 (Anambra) and N539454.22 (Delta). The standard deviation value of 28065.107 (Anambra) and 18488.457 (Delta) is very high to indicate that the volume of credit accessed by the SMs differs greatly or that there is variability in the volume of credit facilities accessed by the SMs. This variability gives the researcher bases for the assertion that the majority of the SMs have access to credit facilities in the study area. Equally, the Z-score of 6.86*** was significant at a 1% level of probability, which implies that the volume of credit facilities accessed in the two states differs significantly. Thus, null hypothesis one (Ho_1) was rejected and the alternative accepted.

Table 2: The Z-score of the difference to corporate credit access

	Delta	Anambra	Z
Mean	539454.22	769921.91	
Std. Dev.	18488.457	28065.107	6.86***
Obs.	217	234	

Source: Field Survey Data, 2021. (*, **, ***) Significant at 10%, 5% and 1% respectively

Hypothesis Two

The null hypothesis two (Ho_2) assumes that collective price and supply regulation affect the profitability of the sand miners association. The indicators of these collective price and supply regulation variables identified in the study were analyzed with multiple regression analysis to make a deduction from the t-ratios of the analysis. The result presented in table 4.9 had a coefficient of multiple determinant (R^2) value of 0.143 (Anambra) and 0.268 (Delta), this implies that collective price and supply regulation explains 14.3% (Anambra) and 26.8% (Delta) variation in the SM's profitability, while the remaining 85.7% (Anambra) and 73.2% (Delta) unexplained were due to external error beyond the control of the SMs.

Table 3: The regression output for hypothesis two

Price and supply regulation	Anambra		Delta	
	Coefficient	t-ratio	Coefficient	t-ratio
Administrative requirements required prior to start-up	0.000	-0.05	-0.038	-2.49**
Administrative limits on daily supply output	-0.029	-3.65***	0.038	3.60***
Price fixing regulations	0.022	2.91***	-0.025	-2.40**
Setting benchmark price and price monitoring	-0.014	-1.65*	0.154	6.54***
Enhanced sustainable market development	-0.029	-3.88***	0.040	3.81***
Intercept	3.105	60.28	2.671	24.30
R^2	0.143		0.268	
F-statistics	7.61***		15.44***	
Obs.	234		217	

Source: Field Survey Data, 2021. (*, **, ***) Significant at 10%, 5% and 1% respectively.

Furthermore, the F-statistics value of 7.61*** (Anambra) and 15.44*** (Delta) significant at 1% level of probability is an indication that the entire model is fit to explain the effect of collective price and supply regulation on the profitability of the SMs.

In Anambra

The coefficient of administrative limits on daily supply output (0.029) was negative and significant at a 1% level of probability; this implies that a marginal increase in the number of SMs that could not meet up with this indicator will reduce their profitability by 2.9% in the study area. The coefficient of price-fixing regulations (0.022) was positive and significant at a 1% level of probability; this implies that a marginal increase in the number of SMs association implementing this indicator will increase the profitability of the members by 2.2% in the study area. The coefficient of setting benchmark price and price monitoring (0.014) was negative and significant at 10% level of probability; this implies that a marginal increase in the number of SMs association that fails to comply with this indicator will reduce the profitability of members by 1.4% in the study area. The coefficient of enhanced sustainable market development (0.029) was negative and significant at a 1% level of probability; this implies that a marginal increase in the number of SMs association that fails to comply with this indicator will reduce the profitability of members by 2.9% in the study area.

Equally, in Delta

The coefficient of administrative requirements required before start-up (0.038) was negative and significant at a 5% level of probability; this implies that a marginal increase in the number of SMs association members that could not meet up with this indicator will reduce the member's profitability by 3.8% in the study area. The coefficient of administrative limits on daily supply output (0.038) was positive and significant at a 1% level of probability; this implies that a marginal increase in the number of SMs association members that could meet up with this indicator will increase the member's profitability by 3.8% in the study area. The coefficient of price-fixing regulations (0.025) was negative and significant at a 5% level of probability; this implies that a marginal increase in the number of SMs associations that could not implement this indicator will reduce the profitability of the members by 2.5% in the study area. The coefficient of setting benchmark price and price monitoring (0.154) was positive and significant at a 1% level of probability; this implies that a marginal increase in the number of SMs association that complies with this indicator will increase the profitability of members by 15.4% in the study area. The coefficient of enhanced sustainable market development (0.040) was positive and significant at a 1% level of probability; this implies that a marginal increase in the number of SMs association that complies with this indicator will increase the profitability of members by 4.0% in the study area. This result was in agreement with Develtere (2008) who suggested that members of an association with a common ideology capable of forming into a cooperative can enhance growth and productivity. Thus, the Ho_2 was rejected based on those significant indicators.

Hypothesis Three

The null hypothesis three (Ho_3) which assumes that members education, training and information does not influence their literacy level was tested using the multiple linear regression technique.

Table 3: Pooled regression analysis of the effect of member's education and training on member's literacy level.

Variable	Coefficient	t-ratio
Education has greatly enhanced members business management skills	0.112	5.907**
Training has a beneficial effect on capacity development among members	0.082	6.605***
Training on cooperative principles has enhanced mutual cooperation among members	0.021	2.302*
Training has developed the risk management principles of the association	0.066	6.047***
Intercept	6.106	
R^2	0.667	
F-statistics	56.91***	
Obs.	234	

Source: Field Survey Data, 2021. (*, **, ***) Significant at 10%, 5% and 1% respectively

A multiple regression analysis was used to ascertain the effect or econometric relationship between the member's education and training on members' literacy level. The pooled analysis recorded the coefficient of multiple determinant (R^2) value of 0.667 (Anambra & Delta). This effect size is an indication that the joint action of the SM's education and training explained 66.7% variation in SMs literacy level. The remaining 33.3% was a result of errors external to the SMs. Their F-statistics value of 56.21*** indicated that the model was significant at a 1% level of probability to indicate a good fit model and the entire significance of the regression model. This result is the logical ground why Ho_3 was rejected.

Hypothesis Four

The null hypothesis four (Ho_4) which assumes that concern for the environment of the host community will have no significant effect on the sustainable development of sand miners association was tested with a Wilcox sign test (nonparametric tool).

Table 4: The sign test of the concern for the environment of the host community.

State	Sign	Obs.	Sum rank	Z	P > |z|
Anambra	Positive	168	23503.5	9.67***	0.000
	Negative	37	3556.5		
	Zero	29	435		
Delta	Positive	154	19787	8.84***	0.000
	Negative	37	3515		
	Zero	26	351		

Source: Field Survey Data, 2021. (*, **, ***) Significant at 10%, 5% and 1% respectively

The positive responses which indicate the number of SMs with a mean threshold of 3.0 is 168 (Anambra) and 154 (Delta). Those with failed attempts with a mean threshold less than 3.0 are 37 (Anambra) and 37 (Delta) respectively. The test was significant at 0.01 alpha level of probability. The Z-value of 9.67*** (Anambra) and 8.84*** (Delta) is an indication that the concern for the environment of the host community is effective on a sustainable basis. This result is the logical ground why Ho_4 was rejected.

4. CONCLUSION AND RECOMMENDATIONS

Mining has proven to be a viable industry capable of creating employment in Nigeria, Sand mining in Anambra and Delta state to check the prospect of converting the association into a cooperative society, this is because most of their association activities stem from cooperative principles. One of the main reasons the association should think toward formalizing the cooperative institution is because of sustainability as well as to give them some protection against some unforeseen government policies that may hamper their operation. It has been clearly shown by the study that the members of the sand mining association had access to credit and forming them into formalized cooperative society can boost their access to this credit seen that the members can cross guarantee each other.

In conclusion the study has established that there was a significant (6.86***) difference in the amount of credit accessed by the sand miners in Anambra and Delta state. Collective price and supply regulation affect profitability was significant 7.61*** (Anambra) and 15.44*** (Delta) in the study area. The study also established that the effect of concern for the environment of the host community was significant in Anambra (9.67***) and Delta (8.84***) and that sand miner's access to credit as a way of poverty alleviation was significant (3.69***) only in Delta state. The study therefore recommends that:

1. The sand miners need to be organized into a formidable cooperative association to improve their performance. These would enable the formation of strategies aimed at improving their economic, literacy and social responsibility concerns of cooperative sand miners in southeastern Nigeria.
2. There is a need to be firm in enforcing the supply and price regulations services of the sand miners association in the study area. Additionally, the government should play a supervisory role in this primary are to ensure that monopolistic or oligopolistic tendencies do not emerge among the sand miners in the study area, i.e., proper supervision and monitoring of supply and price regulations services are put in place.
3. Education and training programmes targeted to improve the literacy level of the association members should be improved upon.
4. The members of the sand mining association should continue with their corporate social responsibility as a way of giving back to society. Their concern for the environment of the host community should be driven by sustainability measures or strategies.

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