



Statistics Sierra Leone



2012

ANNUAL SURVEY REPORT OF QUARRYING ACTIVITIES IN SIERRA LEONE

Conducted by Statistics Sierra Leone



September, 2013



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ABBREVIATIONS

ADB	African Development Bank
AFP	Agenda for Prosperity
BSL	Bank of Sierra Leone
DFID	Department for International Development-UK
ECOWAS	Economic Community of West African States
GDDS	General Data Dissemination System
GDP	Gross Domestic Product
IMF	International Monetary Fund
NSDS	National Strategy for the development of Statistics
PRSP	Poverty Reduction Strategy Paper
SCB	Statistical Capacity Building
SSL	Statistics Sierra Leone

ACKNOWLEDGEMENT

This survey is conducted annually so as to obtain pertinent information on sand mining and stone-breaking activities in the country. Quarrying activities are part of the mining and quarrying activity classified under the International Standard Industrial Classification (ISIC) revision 3.1, which classifies all economic activities according to their natural relationships. The output of this sector is not only counted as part of the mining and quarrying sector but also as an input of the construction sector. The survey is the second attempt to generate information of the quarrying industry; the first was conducted in 2010. The 2010 quarrying activities survey laid the foundation for subsequent surveys designed to capture indicators about the contribution of quarrying to GDP in the country. The main objective of the survey is to estimate the volume of sand extracted as well as the economic value of the stone breaking activity in the country to be included in the compilation of GDP, especially the quarrying sector.

This survey report has been compiled by a dedicated Team of Statisticians and data collectors and supervisors under my Supervision. SSL Management therefore acknowledges the immense contribution which the following people made towards the conduct of the survey: Abu Bakarr Turay, Head of National Accounts and Director of Economic Statistics Division; and Osman Koroma, Ibrahim Samura and Clementina Akran, all of National Accounts Statistics Section.

We also wish to thank our Data Collectors, Supervisors and our valued respondents who took some time off to take part in the data collection exercise.

We are also grateful to Government for funding this exercise.

Mohamed King Koroma
Statistician General

EXECUTIVE SUMMARY

Sierra Leone is a country rich not only in minerals but also in sand and other geological resources such as rocks and pebbles. Sand mining refers to the extraction of sand, mainly through an open pit, or from beaches, inland dunes and dredged from ocean and river beds. Sand is often used to make concrete, which is a mixture of sand, pebble stones and cement. As the population of the country grows, construction requires less wood and more concrete, leading to a demand for low-cost sand. Sand mining contributes to the construction of buildings and development. However, the negative effects of sand mining include the permanent loss of sand in areas, as well as major habitat destruction; which means that sand mining and stone breaking activities could result in loss of bio-diversity along the coastlines of the country, which in turn negatively impact the environment.

The main objective of the survey is to estimate the volume of sand extracted as well as the economic value of the stone breaking activity in the country to be included in the compilation of GDP, especially the quarrying sector; as well as to independently estimate the contribution of sand extraction and hence quarrying to the GDP

The specific objectives include:

The survey covered 13 sites where sand and stone mining activities were mostly concentrated; so as to obtain fairly comprehensive and accurate estimates for this sector of our economy. However, it was found out that sand mining has been stopped at sites such as Hamilton Beach, Goderich Bololo, Lakkah Beach, Adonkia, Sussex, and sugar land all in the Freetown Peninsular. This underscores the fact that sand is after all not an infinite resource, and must be used with great care. Individual and households used mainly rudimentary tools to carry out stone breaking activity, while companies such as CSC, China Railway etc. are using machines to break stones.

The survey revealed that sand mining employs the larger part of the 604 persons working in quarrying activities in the localities surveyed. This means that of the 604 persons 60.8% were engaged in sand mining activities in the various localities, compared with the 39.2% engaged in stone breaking activities. The results underscore the important role of sand mining as it provides employment for able-bodied youth in the various localities.

It also shows that a total amount of Le 65,131 Million was declared as total turnover by operators in the various localities for both sand mining and stone breaking activities. Of this amount, 80.7% was declared by operators in sand mining, while the remaining 19.3% was associated with stone breaking activities in the localities. Also a total cost of Le 10,168 Million was incurred by operators in 2012, 69.1% was incurred by sand miners, while 30.9% was incurred by stone breaking activities.

It was observed that there was no regulatory framework in place to regulate sand mining and stone breaking activities in the country. Although Local Councils are trying to fill the gap, there is still limited coordination among authorities such as the Head Man/Chief and local council officials. There is therefore need to establish a legal regulatory framework spelling out the coordination mechanism among various stakeholders in the quarrying sector.

Construction companies such as CSC, China Railway, Salcost, etc involved in sand mining and stone breaking should be made to pay compensation to host communities as their actions have lasting impact not only on the land but also on the lives and livelihood of such host communities

1.0 INTRODUCTION

1.1 Background

Sierra Leone is a country rich not only in minerals but also in sand and other geological resources such as rocks and pebbles. In the past the Sierra Leone economy has relied heavily on the mining sector in general, and diamonds in particular, for its economic base. In the 1970s and early 1980s, economic growth rate slowed because of a decline in the mining sector and poor macro economic policies. The revamping of the economy after the war would require major sectors like Mining and Quarrying to perform and to meet expectations once again.

Geological studies have shown that majority of rocks in Sierra Leone are of Precambrian age (over 600ma), made up mostly of granites, gneisses and greenstones (the Basement Complex), which are very suitable for construction. Lying on the basement to the West and partly on the Freetown Peninsula is the Bullom Group, which is made up of poorly consolidated sands and clays, which is easily extracted. The Freetown Peninsula (Freetown Complex) lies in extreme West of Sierra Leone, made up of igneous rocks of the gabbro family; Atlantic coast line of the Peninsula fringed by a series of sandy beaches. The western area coast extends from Aberdeen to Kent then turning North East from Kent to beyond Tombo; a length of about 50km. All these features underscore the fact that quarrying is a suitable activity in the country; and the need to develop the infrastructure of the country under Agenda for Prosperity strategy means that it is also an economically viable activity. As a result there is need for such an activity to be accurately accounted for in our gross domestic product (GDP) estimation. Quarrying is not only an economic activity, but it is also an important input into the construction sector, which is a key component of the Agenda for Prosperity (AFP)

Given the fact that Sierra Leone has fairly large deposits of sand, sand beaches and rocks throughout the country, these resources are exploited for construction of residential houses and business premises in the country as major economic activities. Both households and business enterprises are engaged in the extraction of sand. However, quarry as an economic activity (e.g. sand extraction

and stone-breaking) is largely informal carried out by individuals. Apart of construction companies, there are only a few registered business establishments that are engaged in sand extraction and/or stone-braking activities in the country. Construction companies such as CSC, Chin Railway, Salcost etc. use sophisticated machines to break stones, while households and individuals use only rudimentary tools for their work.

Sand mining/extraction areas in the capital city Freetown are recorded as showed below:

Sand Extraction and Stone-breaking Sites

- Hamilton Beach
- Goderich Bololo,
- Lakkah Beach,
- Adonkia,
- Sussex,
- Number 2 River,
- Tokey,
- Big Water,
- Black Johnson,
- John Obey,
- Mama Beach,
- Tombo,
- Tissana,
- Martin Kay,
- Waterloo,
- Deep Eye Water,
- Devil Hole,
- Rokel,
- Sugar Land.
- Mamba Ridge Quarry (Kissy)

The survey covered 13 sites where sand and stone mining activities were mostly concentrated; so as to obtain fairly comprehensive and accurate estimates for this sector of our economy. However, it was found out that sand mining has been stopped at sites such as Hamilton Beach, Goderich Bololo, Lakkah Beach,

Adonkia, Sussex, and sugar land all in the Freetown Peninsular. This underscores the fact that sand is after all not an infinite resource, so care must be taken in extracting it.

1.1.1 Sand Mining

Sand mining refers to the extraction of sand, mainly through an open pit, or from beaches, inland dunes and dredged from ocean and river beds. Sand is often used to make concrete, which is a mixture of sand, pebble stones and cement. As the population of the country grows, construction requires less wood and more concrete, leading to a demand for low-cost sand. Sand is also used to replace eroded coastline. Another reason for sand mining is for the extraction of minerals such as rutile, ilmenite and zircon, which contain the industrially useful elements titanium and zirconium. These minerals typically occur combined with ordinary sand, which is dug up, the valuable minerals being separated in water by virtue of their different densities, and the remaining ordinary sand re-deposited.



Sand mining contributes to the construction of buildings and development. However, the negative effects of sand mining include the permanent loss of sand in areas, as well as major habitat destruction. Also sand mining is a direct cause of erosion, and also impacts the local wildlife. For example, sea birds and other creatures and plants depend on sandy beaches for their nesting and survival; sand mining could lead to the disappearance of such plants and animals around the country. This means sand mining could result in loss of bio-diversity along the coastlines of the country, which in turn negatively impact the environment. In addition, disturbance of underwater and coastal sand causes turbidity in the water, which is harmful for such organisms

as corals that need sunlight. It also destroys fisheries, causing problems for people who rely on fishing for their livelihoods.

Removal of physical coastal barriers such as dunes leads to flooding of beachside communities, and the destruction of picturesque beaches causes tourism to dissipate. Sand mining is regulated by law in many places, but is still often done illegally.

In the 1930s mining operations began in the Eastern part of the country, mainly of diamonds. It is thought that low level sand mining begun much earlier (maybe during the colonial era), although most of the construction materials used then were mainly sticks, boards and mud. However, as Freetown and other communities grew, sand mining became a key activity carried out to supply the expanding construction industry. The beaches along the Freetown Peninsula have provided a convenient source of sand mining activities in the country, mainly to supply the growing demand for modern housing in Freetown.

1.2 Objective of the Survey

The main objective of the survey is to estimate the volume of sand extracted as well as the economic value of stone breaking activity in the country to be included in the compilation of GDP.

The specific objectives include:

- To develop benchmark indicators for estimating sand extraction and stone breaking activities for GDP compilation
- To measure the volume of sand extracted and stone quarried in metric tones
- To estimate the value of sand extraction and stone quarried in millions of Leones

- To investigate the number of persons working on quarrying activities

1.3 Rationale of the Study

This survey is conducted on the recommendation of the GDDS consultation to estimate independently the contribution of quarrying sector. The output of this sector is not only counted as part of the mining and quarrying sector but also as an input of the construction sector. The first survey was conducted in 2010 as part of the effort of SSL to provide relevant information to the users. The survey was designed to capture indicators about the contribution of quarrying to GDP in the country.

2.0 METHODOLOGY

2.1 Coverage

The survey covers all the sand mining and stone-breaking sites identified above. It is mostly an informal survey, conducted on a one-to-one personal interview with persons engaged in sand extraction and stone-breaking activities in the study sites. The survey is limited to Freetown, the capital city, and regional cities of Bo, Makeni and Kenema where majority of the construction activities do take place.

2.2 Data Collection

This Quarrying survey is conducted under the Statistics Act 2002, which makes it mandatory for individuals and/or business establishments operating in sand extraction and stone-breaking activities to cooperate Statistics Sierra Leone designated staff to collect the survey. The Act also provides for confidentiality of the information collection of respondents. A trained team of enumerators and supervisors designated by Statistics Sierra Leone (SSL) undertook the data collection in the selected sites in the Western Area and the regional capital towns of Bo, Makeni and Kenema of the country. At the beginning of the survey, all the field staff are expected to establish contact with the operators in the quarrying sub-sector, to explain the purpose of the survey and to locate contact persons in the area for subsequent visit. The survey spanned a period of four (4) weeks in each quarter of the year 2012. There were five (5) teams deployed to cover a total of twenty-four (24) sites in the Western Area and other sites in the regions. Each team comprised a Supervisor and 3 Data Collectors; and each team was given a number of localities to cover during the survey. The respondents were the individuals or group of individuals engaged in sand mining and stone-breaking activities in the chosen sites

2.3 Survey Organization

There are a total of 15 Enumerators that collected data from the sites selected for the survey under the supervision of 5 Supervisors, and 3 National Coordinators. One Data Entry supervisor, 3 Data Entry Operators and 2 Coder/Verifiers were also part of the survey.

2.4 Data Processing

A Data Processing programme was developed for the entering of questionnaires received from the field. The information in completed questionnaires was manually scrutinized, edited and coded before sending them for entry. Computer editing was also done as a way of validating the data. The data entry process will last for about two weeks.

2.5 Sample Achieved

A total sample of 130 operators in the quarrying sector was targeted for the year 2012; however, a total of 117 operators were successfully interviewed from selected localities, which represents 90.0% response rate. This means a total of 13 operators were not interviewed due to outright refusal. The survey was done using face-to-face interviews with call-backs to completed interviews in some cases.

3.0 DATA ANALYSIS

This section presents the findings of the survey and highlights key issues for policy formulation.

3.1 General Information

The survey collected general information on the individuals and/or establishments operating in the quarrying sub-sector. The information collected ranges from name and address of business, registration status as well as organization status of the establishments canvassed in the survey.

3.1.1 Locality of Establishments

The locality of the establishments constitutes the address of the business covered in the survey; in other wards, it expresses the location or area of the sand and stone miners canvassed. This data on locality is presented in Table 3.1.1.

Table 3.1.1: Distribution of Respondents by Locality

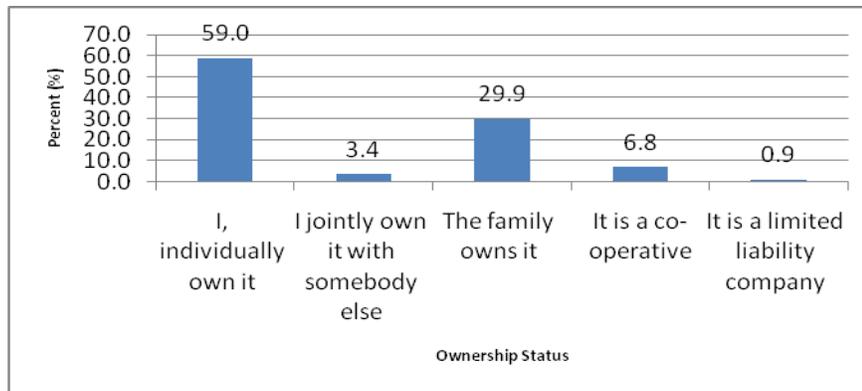
Locality	Frequency	Percent (%)
Goderich	4	3.4
Hamilton	13	11.1
John Obe/Mama	10	8.5
Malama	9	7.7
Rogbangba/Rokel	26	22.2
Tombo	28	23.9
Waterloo	27	23.1
Total	117	100.0

Table 3.1.1 shows that most of the respondents were located at Tombo (23.9%); followed by Waterloo (23.1%), Rogbangba/Rotel (22.2%) and Hamilton (11.1%). These three localities are the sports where sand and stone mining is concentrated. Sand mining in communities such as Sugar Land, Hamilton and Sussex has been stopped by the Local Council authorities due to the erosion that resulted from the persistent sand mining activities in these communities done in the past. Stone mining however is widely spread in the peninsula communities, although in most communities it is done at a lower scale.

3.1.2 Organizational Status

The survey collected information on ownership status of businesses and the results are shown in Figure 3.1.2. The results show that of the 117 establishments covered, 59.0% are individually owned, otherwise known as sole proprietorship.

Figure 3.1.2: Distribution of Establishments by Ownership



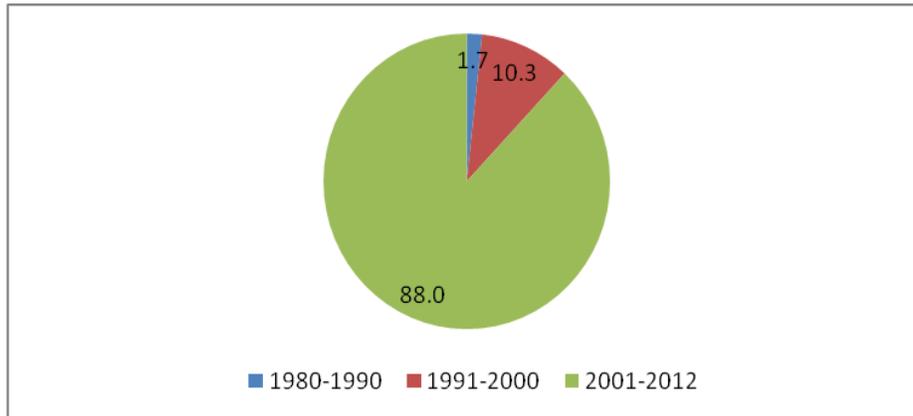
As shown in Figure 3.1.2, there were considerably more Sole Proprietorships (59.0%) than family owned businesses (29.9%) and partnership (3.4%) or cooperatives/groups/association (6.8%). These results underline the small scale nature of business operations in the country and the informal nature of the economy which may be due to the unavailability of funds to undertake such capital intensive activities. There is however a 0.9% proportion of sand and stone mining done by limited liability companies, which included the CSC Construction Company and China Railway Construction Company, whose stone-crushing activities were concentrated mainly in and around Hamilton and Number 2 River communities.

3.1.3 Year of Commencement of Operation

The year of commencement of operation was used to classify the 117 establishments canvassed into:

- 1980-1990
- 1991-2000
- 2001-2012

Figure 3.1.3: Period of Commencement of Operations

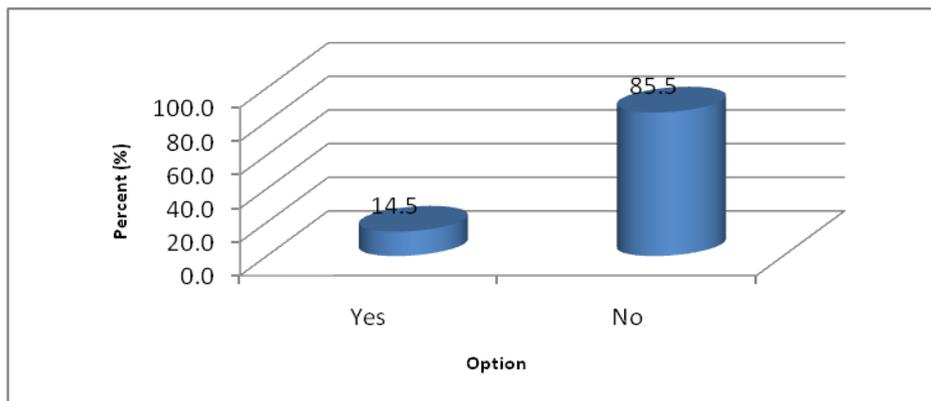


The classification was done in order to isolate the influences of major political decisions on the industrial sector. Even though there has been marked increase in the number of establishments from era to era, the data in figure 3.1.3 shows that most of the businesses. (88.0%) were established during the post war period (2001-2012). This may be due to increased demand for quarrying products as a result of scaling up of construction activities in the capital city and the country as a whole. The increase in construction activities in the country is linked to the expansion in the demand for housing and good roads as part of the reconstruction and revamping of the economic effort after the 10-year civil war.

3.1.4 Registration Certificate/License

The survey also asked respondents whether or not their business operations were registered or licensed with the relevant authorities, which are in this case refers to the Area Chiefs and Local Council Authorities or the Administrator and Registrar General Office and the results are shown in Figure 3.1.4

Figure 3.1.4: Registration Status

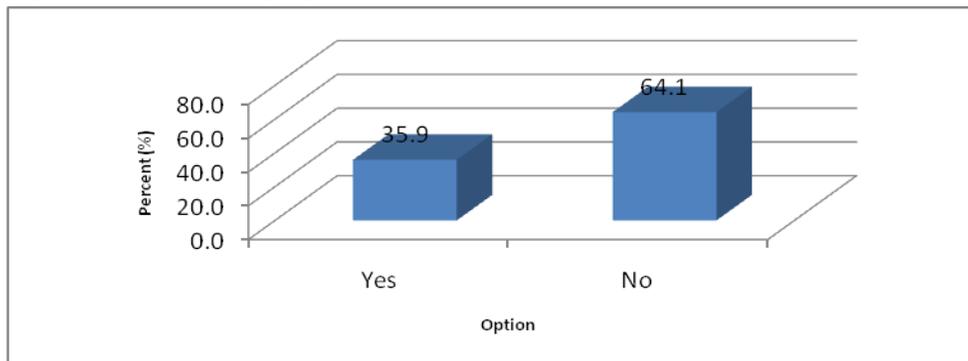


The result shows that only 14.5% of the 117 establishments canvassed have registration or license certificate for operating in the sand mining and stone-breaking quarrying activities in the country. This means that 85.5% is underground and hence operating in the informal sector. It could be that the low capital base of these businesses is responsible for these vast informal operations in the sector, as operators could not afford capital-intensive equipment required for large scale operations. This means that most of sand mining and stone breaking activities are done on a hand-to-mouth basis.

3.1.5 Belonging to an Association

The survey asked whether or not the respondents belong to an association or a group, and the responses are shown in Figure 3.1.5.

Figure 3.1.5: Belonging to an Association



The data in Figure 3.1.5 shows that only 35.9% of the 117 respondents belong to an association or group; while 64.1% are individual miners and enterprises operating in the sector.

3.2 Operating Characteristics

This section analysis operating characteristics of establishments such as employment, operating revenue, operating expenditure, intermediate consumption and gross value added of establishments for the fiscal year 2012.

3.2.1 Employment

3.3.1 Employment Characteristics

Table 3.3.1 shows that sand mining employs the larger part of the 604 persons working in quarrying activities in the localities. This means that of the 604 persons 60.8% were engaged in sand mining activities in the various localities, compared with the 39.2% engaged in stone breaking activities. The results underscore the important role of sand mining as it provides employment for able-bodied youth in the various localities.

Table 3.3.1: Number of Persons Engaged by Activity

Activity	Persons Engaged	Percent (%)
Sand mining	367	60.8
Stone-breaking	237	39.2
Total	604	100.0

Table 3.3.2: Percentage Distribution of Intermediate Consumption (Le'M) by Activity

Activity	Intermediate Consumption	Percent (%)
Sand Mining	7,029	69.1
Stone-Breaking	3,137	30.9
Total	10,165	100.0

The survey obtained data on the intermediate consumption of businesses engaged in sand mining and stone breaking, and the information is presented in Table 3.3.2. The data in Table 3.3.2 show that intermediate consumption, which is part of the running cost of individuals and businesses surveyed valued at Le 10,165 Million in 2012. Of this amount 69.1% was associated with individuals

and businesses operating in the sand mining activities in the data collection centers; while 30.9% of the intermediate cost was associated with stone-breaking activities.

Table 3.3.3: Percentage Distribution of Total Turnover by Locality

Activity	Total Revenue (Le. M)	Percent (%)
Sand Mining	52,569	80.7
Stone-Breaking	12,561	19.3
Total	65,131	100.0

The data in Table 3.3.3 shows that a total amount of Le 65,131 Million was declared as total turnover by operators in the various localities for both sand mining and stone breaking activities. Of this amount, 80.7% was declared by operators in sand mining, while the remaining 19.3% was associated with stone breaking activities in the localities.

Table 3.3.4: Percentage Distribution of Total Cost by Locality

Activity	Total cost (Le'M)	Percent (%)
Sand	7,029	69.1
Stone	3,139	30.9
Total	10,168	100.0

Table 3.3.4 shows that a total cost of Le 10,168 Million was incurred by operators in 2012. Of this total, 69.1% was incurred by sand miners, while 30.9% was incurred by stone breaking activities.

Table 3.3.5: Percentage Distribution of Gross Value Added by Locality

Activity	Gross Value Added (GVA)-Le'M	Percent (%)
Sand	45,541	82.9
Stone	9,424	17.1
Total	54,965	100.0

Table 3.3.5 shows that the gross value added from the sector amounted to Le 54,965 million in 2012. Of this amount 82.9% came from Sand mining activities, while 17.1% came from stone breaking activities.

4.0 RECOMMENDATIONS

It was observed that there was no regulatory framework in place to regulate sand mining and stone breaking activities in the country. Although Local Councils are trying to fill the gap, there is still limited coordination among authorities such as the Head Man/Chief and local council officials. There is therefore need to establish a legal regulatory framework spelling out the coordination mechanism among various stakeholders in the quarrying sector.

Construction companies such as CSC, China Railway, Salcost, etc involved in sand mining and stone breaking should be made to pay compensation to host communities as their actions have lasting impact not only on the land to also on the lives and livelihood of such host communities

APPENDIXES

Appendix 1: Mining Sites and Number of Persons Involved

Quarry Sites Investigated	Nature	Persons/Est. Involved
Bololo (Goderich)	Artisanal	60
BAO Ltd. Quarry (Goderich)	Industrial and Artisanal	20
CPA Resources Quarry (Goderich) Industrial	Artisanal	3
Mamba Ridge Quarry (Kissy)	Artisanal	37
Salcost Quarry (Near Bo)	Industrial	1
Tiaiama – on the River Tiai.	Artisanal	29
Lembema/Nyeyema – on the River Sewa	Artisanal	28
Gondama – on the River Sewa	Artisanal	37
Tulurma/Jagbwema – on the River Moa	Artisanal	24
Hamilton Beach	Artisanal	50
Lakkah Beach,	Artisanal	41
Adonkia	Artisanal	37
Sussex	Artisanal	56
Number 2 River	Artisanal	60
Tokey	Artisanal	30
Big Water	Artisanal	20
Black Johnson	Artisanal	10
John Obey	Artisanal	30
Mama Beach	Artisanal	33
Tombo	Artisanal	40
Tissana	Artisanal	15
Martin Kay,	Artisanal	20
Waterloo,	Artisanal	38
Deep Eye Water	Artisanal	33
Devil Hole	Artisanal	24
Rokel	Artisanal	17
Sugar Land	Artisanal	39
Total		832

CEMMATS Report, 2009 and SSL Sand Survey Report, 2010

Appendix 2: Survey Questionnaire



STATISTICS SIERRA LEONE

THE SURVEY OF SAND EXTRACTION AND QUARRYING ACTIVITIES, 2012

Authority and Confidentiality: The survey is conducted under the authority of the Statistics Act, 2002, which means that Completion of this questionnaire is a legal requirement by all businesses or individuals selected for the survey. Also the Statistics Act 2002 provides for the confidentiality of the data collected, as a result the data reported in this questionnaire will be treated in strict confidence and published only in aggregates.

Coverage: The survey covers all businesses or individuals engaged in sand extraction and/or stone-breaking in this community. Please complete (or assist the Enumerator to complete) this questionnaire for your business unit or your activity located in this community or in Sierra Leone as a whole.

Objective: This survey is conducted in order to obtain relevant data on quarrying activities in the country, which is an important part of the mining and quarrying industry. Such data is used to compile the Gross Domestic Product (GDP), which is a vital indicator used to analyze the performance of the economy.

A. General Information

1a. Name of Business (If No name, write the proprietor's Name).....

1b. Address of business.....

1c. Locality..... District

2. How many branches/outlets do you have for which data is being provided?
Number.....

3. Name of Respondent/Contact Person:..... Designation:
Mobile/Tel No: Sign (and official stamp if available)

4. Which of the following best describes the ownership of this business: (Circle one only)

1. I, individually own it
2. I jointly own it with somebody else
3. The family owns it
4. It is a co-operative
5. It is a limited liability company
6. Other ownership (specify).....

5. Which year did you start this business? Year

6. Do you have a registration certificate or license to carry out this activity? 1- Yes
2- No

7. If yes, which year was this business registered or licensed? Year.....

8. How many persons are currently engaged with this business (paid or unpaid)?
Number

9. What is the main kind of activity you currently engaged in? 1-Sand extraction 2-
Stone-breaking 3-both

Section B: Sand Extraction/Stone-Breaking

10. Which work do you do: 1-Sand miner 2-Stone-breaker 3-Driver/owner

11. Do you belong to any Association? 1 Yes 2 No

11a. Name of Association

11b. Contact Person 11c. Mobile no.....

12. Number of Vehicles registered with this Association

13. Are there other Vehicles in this Business that are not registered with this Association
 1-Yes 2-No
14. If yes, how many of such Vehicles? Number
15. On average, how many trips of sand/stone do you load or drive per day? Number

16. Of this number, how many are double trips made
17. What is the average cost of extracting/loading a trip of sand/stone in 2012 (Jan-Sept)?
 a) Single trip Mass (kg) of sand/stone.....
 b) Double trip Mass (kg) of sand/stone.....
18. What is the average value of a trip in 2012 (Jan-Sept)?
 a) Single trip
 b) Double trip
19. Please provide estimates for the following for 2012 (Jan-Sept):
 a) Average number of gallons of Fuel consumed per day
 b) Average cost on maintenance and spares per month
 c) Other costs excluding Vehicle and Driver licenses
 d) Total amount of wage/salary paid to workers (if any)
20. How many days a week did you usually work in 2012 (Jan-Sept)? Number.....
21. On average, how many single trips of sand/stone did you sell/load per day in 2012 (Jan-Sept)? Number
22. On average, how many double trips of sand/stone did you sell/load per day in 2012 (Jan-Sept)? Number
23. The vehicles used, were they registered/licensed with the Sierra Leone Road Transport Authorities (SLRTA)?
 1 Yes
 2 No

Name of Enumerator: -----

Date: ----- Signature: -----

Name of Supervisor: -----

Date: ----- Signature: -----