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# SUSTAINABLE FISHERIES MANAGEMENT PROJECT (SFMP)

## The Value and Volume of Oysters Harvested from the Densu Estuary: A Rapid Assessment

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THE UNIVERSITY OF RHODE ISLAND
GRADUATE SCHOOL OF OCEANOGRAPHY
CRC COASTAL RESOURCES CENTER

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**Cover Photo**: Women oyster pickers harvesting oysters in the Densu Delta

**Photo Credit**: Development Action Association

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## Acronyms

| | |
|---|---|
| CRC | Coastal Resource Center |
| DAA | Development Action Association |
| DOPA | Densu Oyster Pickers Association |
| FC | Forestry Commission |
| NGOs | Non-Governmental Organizations |
| SFMP | Sustainable Fisheries Management Project |
| URI | University of Rhode Island |
| USAID | United States Agency for International Development |

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# SECTION 1: THE VALUE AND VOLUME OF OYSTERS HARVESTED FROM THE DENSU ESTUARY:

Rapid Assessment

## 1.1 Summary

The Sustainable Fisheries Management Project began working with the oyster harvesters of the Densu Delta in 2016. There are about 140 oyster harvesters in the Delta, many of whom rely on the profits and protein derived from the estuary's oysters on a weekly basis. There have been no previous estimates of either the monetary benefits individual oyster harvesters are receiving from the fishery, or how much of the fishery they are consuming. In addition, there have been no estimates of the total value or volume of oysters harvested from the Delta to date.

## 1.2 Purpose

This rapid assessment attempts to provide a first approximation estimate of the value and volume of oysters coming from the Densu Delta. The study is also expected to identify what percentage of the oyster harvest is consumed at home for food security, and what percent is sold for income generation, and gross revenues derived from the fishery by the oyster pickers.

## 1.3 Methodology

The Densu Oyster Study employed an 18 question survey using a convenience sampling technique on May 7th and 8th of 2018. The total sample size of the study was 46 persons, where 89% of the respondents were female. Surveys took place in four different communities, with harvesters who collect oysters from seven different sites in the Densu Delta. Field data collection was undertaken using a survey instrument (Annex 1) loaded onto Samsung tablets and for the data entry using Kobo Toolbox. Survey responses were saved to and retrieved from a cloud stored database. Data was quality control checked and cleaned by the authors. Suspect responses from one data enumerator on months of dry and wet seasons was thrown out as they differed significantly from other enumerators responses. In one case a field enumerator recorded used old cedis instead of new cedis on prices reported by respondents and these were converted so all responses on prices is in new cedis. Analysis was conducted using SPSS 24 and Microsoft Excel.

The survey was constructed in order to utilize the local knowledge of daily landing estimates to approximate the value and volume of a yearly Densu oyster harvest. Since daily landings and harvest effort differ seasonally (in the rainy season, women report that there are days when water flow is too strong or high to harvest), we first asked which months of the year were considered the dry season, and which months were considered to be the rainy season. We then asked respondents to estimate how many days per week harvesters collected oysters and how many baskets of oysters were collected, for each season. Oysters are generally sold in piles, or heaps, of shucked oysters so in order to estimate the value of a basket, the survey asked respondents to estimate how many heaps are in a basket, and how much they charge for said heap. We also identified the average weight of a basket of oysters.

In order to identify how oysters are used after collection (e.g. sold or for home consumption), the final questions of the survey asked respondents to estimate how many heaps they sell at market, and how many they consume at home. We then averaged all of the respondent's answers.

The variables of interest to this study and the formulas used to calculate their values are found in Table 1.

**Table 1: Formulas used to calculate key variables**

| Variable | Formula |
|---|---|
| Heaps Harvested in a Day | ((baskets per day rainy + baskets per day dry)/2) x heaps per basket |
| Days spent Harvesting per Season (rainy) | months x weeks per month x days per week spent harvesting |
| Days Spent Harvesting per Season (dry) | months x weeks per month x days per week spent harvesting |
| Total Days Spent Harvesting per Year | Days harvesting rainy + days harvesting dry |
| Baskets Harvested per year (rainy) | Days harvesting rainy x baskets per day rainy |
| Baskets Harvested per year (dry) | Days harvesting dry x baskets per day dry |
| Total Number of Baskets Harvested per Year | Baskets per year rainy + baskets per year dry |
| Total Number of Heaps Harvested per Year | Total baskets yearly x heaps per basket |
| Heaps Consumed and Sold in a Day | Heaps consumed daily + heaps sold daily |
| Heaps Consumed and Sold in a Year | Heaps consumed and sold x total days spent harvesting |
| Yearly oyster Volume | Baskets Harvested per year x weight of basket |

## SECTION 2: RESULTS

Figure 1 shows the location of where the surveys took place, which are the main communities where oyster harvesters live. The figure also shows where respondents harvest oysters in the Delta. Harvest locations refer to water areas within the Delta itself.

Figure 2 shows respondent perceptions of the period and duration of the rainy and dry seasons.

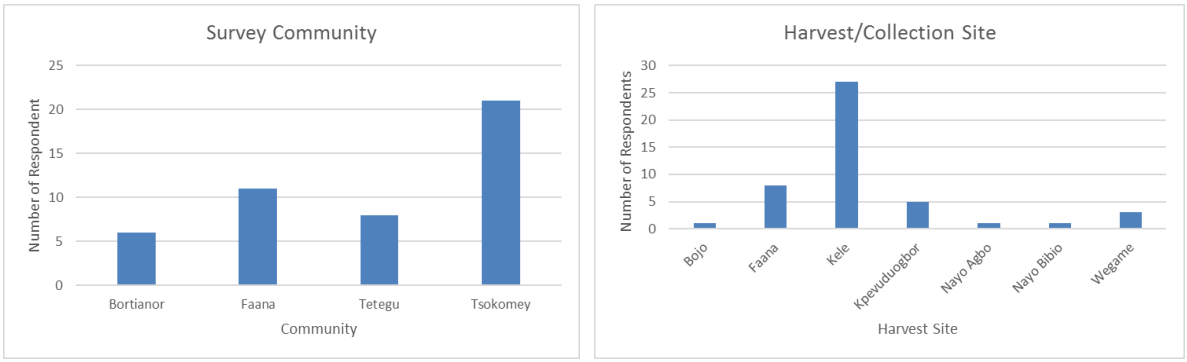


**Figure 1: Communities surveyed and respondent's oyster collection site (n=46)**

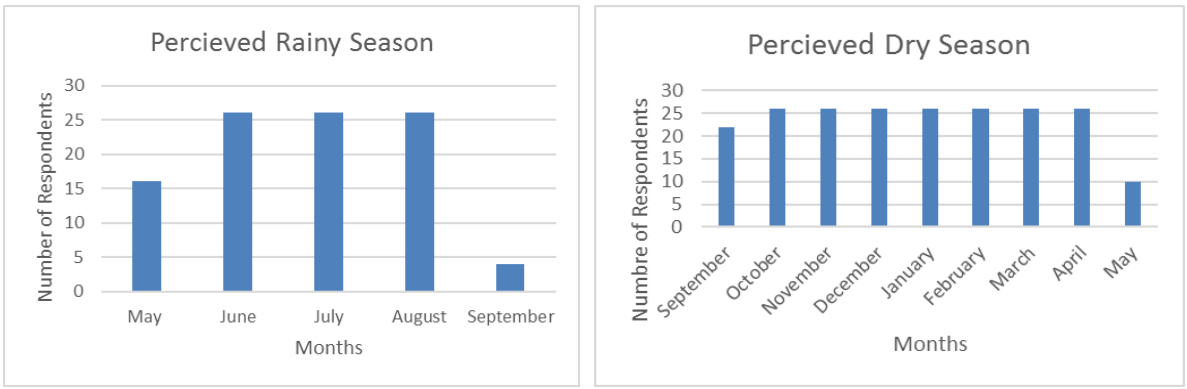


**Figure 2: Respondent perceptions of rainy and dry seasons (n=26)**

Values for certain parameters were calculated using the formulas described in Table 1 above. The average value and standard deviations of the responses to the questions in the survey, as described in the methods section of this report, can be found in Table 2. These formulas and values were then used to calculate key variables of major interest.

**Table 2: Summary of respondent's averages**

| Variable | Season | Average | Standard Deviation |
|---|---|---|---|
| Number of Months | Rainy season | 3.8 | 0.59 |
| | Dry season | 8.2 | 80.59 |
| Weeks per Month | Rainy season | 4.4 | |
| | Dry season | 4.3 | |
| Days per Week Spent Harvesting | Rainy season | 2.3 | 1.5 |
| | Dry season | 2.9 | 1.6 |
| Baskets Harvested per Day | Rainy season | 5.3 | 5.0 |
| | Dry season | 7.4 | 5.25 |
| Heaps in a Basket | ------- | 1.576 | 0.94 |
| Heaps Consumed at Home | ------- | 1.2 | 0.49 |

| | | | |
|---|---|---|---|
| Heaps Sold in a Day | ------- | 3.5 | 2.83 |
| Price Per Heap (in Ghana cedis) | ------- | 10.7 | 4.74 |
| Weight of oysters in one basket (kgs) | ------- | 23 | |
| Weight of a heap of oysters(kgs) | ------ | 3.5 | |

Table 3 describes the value of variables calculated in order to estimate the value and volume of oysters harvested. Since the estimated number of oysters harvested per day is twice as large as the estimated number of oysters consumed in a day plus the average number of oysters sold in a day, we w report the range of estimated values and volumes using these two ways of obtaining the estimation. The reported average price per heap was 10.7 cedi. Multiplying this number by the number of heaps consumed and sold in a year, and by the number of heaps harvested in a year, we find that the average yearly value of oysters harvested by one person in the Densu Delta ranges between 7,081 and 16,207 cedis. If we assume that there are 140 oyster harvesters in the Delta, then the estimated value of the oyster harvest from the Densu Delta is between 991,382 and 2,269,022 cedis.

**Table 3: Calculated values for oyster data**

| Variable | Value |
|---|---|
| Heaps Harvested in a Day | 10.0 |
| Days spent Harvesting per Season (rainy) | 38.5 |
| Days Spent Harvesting per Season (dry) | 102.3 |
| Total Days Spent Harvesting per Year | 140.8 |
| Baskets Harvested per year (rainy) | 204.1 |
| Baskets Harvested per year (dry) | 757.0 |
| Total Number of Baskets Harvested per Year | 961.1 |
| Total Number of Heaps Harvested per Year | 1,514.7 |
| Heaps Consumed and Sold in a Day | 4.7 |
| Heaps Consumed and Sold in a Year | 661.8 |
| Yearly Oyster Volume Harvested (kg) | 22,105.3 |

Based on the data about oyster consumption and sales the results show that on average 26% of oysters are eaten at home, and 74% of oysters are sold. Therefore, each oyster harvester's gross revenue from sales estimates range between 5,240 and 11,993 cedis per year, or 37.22 to 85.18 cedis (US$ 8.06 and 18.45 respectively) per day they harvest, which on average is 141 days in a year. The yearly volume of oysters harvested is 22,105 kg (in their shells) based on baskets harvested times weight of oysters per basket. This translates into 5,301 kg of shucked oysters based on the total number of heaps harvested in a year. Based on heaps consumed and sold in a day, the total volume of shucked oysters is estimated at 2,316 kg per

year. This shucked weight represents the processed product that is consumed as food by people.

## SECTION 3: CONCLUSION AND RECOMMENDATIONS

This study revealed that the Densu Delta oyster fishery has significant worth, between 991,382 and 2,269,022 cedis yearly, representing over 22 MT of oysters harvested yearly. We believe this million-cedi fishery is not fully recognized for its significant economic contribution to fisheries in Ghana. This value and volume represents a significant asset to the communities that rely on the oyster fishery for income generation and household food security. This women-dominated "invisible" fishery should be managed by the harvesters themselves in order to sustain the ecosystem services and benefits they provide to the people surrounding the Delta.

This study was not designed to estimate net income or contribution to household income. However, the delta and the oysters that are harvested are serving the 140 oyster pickers such that the net income generated during harvest days may maintain these households above the World Bank poverty rate threshold for daily per capita consumption of $1.90. This rate was updated in 2015 to $1.90 per day, compared to $1.25 per day per set in 2008. Bear in mind however, that the daily gross revenue per harvester, from US$ 8 -18 per day, are not net profits or income generated per day. Women sometimes pay for laborers to carry baskets from harvesting areas to processing sites, or rent a boat, and buy fuel wood to steam the oysters before shucking. In addition, the income from oysters may not be only source of household income and it is not generated every day, as on average, the women only harvest 141 days a year. Nor do we know the number of dependents per oyster picker household. The closed season now being practiced may further limit the number of days harvesting but may also change the value and volume of the oysters harvested as women are reporting larger sized and more plentiful oysters immediately after the opening of the first seasonal closure.

In order to more fully understand what this fishery means to oyster picker households, we recommend further studies investigating the net income contribution to overall household income, as well as other poverty and nutritional measures such as dietary diversity and household hunger scales. In addition, such studies could also examine indirect benefits and value derived from the fishery in terms of associated labor for individuals carrying baskets, renting boats and fuel wood sales. Shucked oyster shells also have value and are occasionally sold to chicken farmers and/or used as a land fill for household construction and may provide additional income or value to oyster harvesters. Lastly, children often accompany women on oyster harvesting expeditions and participate in harvesting and sometimes as carriers of baskets of harvested oysters. This practice, if and when children are involved in the fishery, should be looked at more carefully to ensure that proper child labor standards are followed.

## ANNEX 1: DENSU OYSTER SURVEY

Interviewer Name

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Community

- ◯ Tsokomey
- ◯ Tetegu
- ◯ Faana
- ◯ Bortianor
- ◯ Other

Define Other

---

Harvest/Collection Site

- ◯ Bojo
- ◯ Nayo Bibio
- ◯ Nayo Agbo
- ◯ Kpevuduogbor
- ◯ Faana
- ◯ Wegame
- ◯ Kele
- ◯ Other

Define Other

---

Sex

- ◯ Female
- ◯ Male

What months are rainy season?

- ☐ January
- ☐ February
- ☐ March
- ☐ April
- ☐ May
- ☐ June
- ☐ July
- ☐ August
- ☐ September
- ☐ October
- ☐ November
- ☐ December

Which months are dry season?

- ☐ January
- ☐ February
- ☐ March
- ☐ April
- ☐ May
- ☐ June
- ☐ July
- ☐ August
- ☐ September
- ☐ October
- ☐ November
- ☐ December
- ☐ Last Year when did Closed Season Begin? *Yyyy mm-dd* _____

How many Weeks is Closed Season? _____

Over last year, during rainy season, on average how many days per week did you harvest oysters?

_____

Over last year, during dry season, on average how many days per week did you harvest oysters?

_____

Last year, on average, how many baskets of oysters did you harvest daily during rainy season?

_____

Last year, on average, how many baskets of oysters did you harvest during dry season?

_____

How many heaps of shucked oysters are in one basket?

_____

How many oysters are in one heap?

_____

Are the oysters for consumption at home?

- ◯ Yes
- ◯ No

How many heaps of oysters does your household consume in one day? _____

Do you sell the oysters?

- ◯ Yes
- ◯ No

How many heaps of oysters do you sell in one day? _____

How much do you charge for one heap? _____