

**Taikichiro Mori Memorial Research Grants 2017**

Research Achievement Report

**Project Title: Assessment of Risk to Coastal Erosion in Keta Municipal of  
Ghana: Opportunities and Limitations for Adaption and Mitigation**

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## Introduction

As part of the fulfilment of the Taikichiro Mori Memorial Research Grants 2017 from Keio University – SFC, recipients are to submit Research Achievement Report and therefore, this report summarizes the activities of the fieldwork conducted and data analysis by the support of the fund. I undertook a fieldwork in Keta in the Volta Region of Ghana for the period between September 4 and September 21. The aim of this fieldwork was to conduct primary data collection from relevant stakeholders involved in my research study which concerns Coastal Erosion. The data collection stakeholders were grouped into three categories for easy and orderly manner. These categories are the National Level data, the Municipal Level data and the Local Level data. The national level data were information to be gathered from Ghana national institutions, particularly; nation/public offices. The municipal level data were to be collected from the Keta Municipal Assembly; which is the authority responsible for the managing the municipal. The last data set i.e. the local level were to be collected from the households which includes tenants, house owners, community leaders and opinion leaders. The local level data comprised of four communities. However, a secondary data which is climate data, was required to scenario analysis and this was acquired through a software package (SimCLIM) which comes with the entire Ghana climate data.

In all, a total of eighty questionnaires were administered at the local level with twenty questionnaires administered in each of the four communities through a random sampling technique. Although there were challenges with regards to the data collection, relevant information was gathered and these are useful in the analysis of the situation in the study area. The challenges range from unavailability of data to un-willingness to provide data from some respondents. The research again required the use of high resolution orthophoto and remote sensing data for analysis and therefore, a high specification laptop was required to process the big data. To this reason, a Microsoft Surface was purchased for this purpose. On the other hand, since questionnaires were to be administered at the local level, a gate keeper was needed to translate the questionnaires for the local people to understand and therefore, a local community member was asked to perform this duty at a honorarium of 1050yen.

## 2.0 The Study Area

Keta Municipal, with Keta as the capital is one of the 25 Administrative Municipal/Districts of the Volta Region of Ghana. It was carved out of the former Anlo District, which comprised Akatsi and Ketu Districts. The Keta Municipal Assembly was established by the Establishment Instrument (L.I.) 1868 of 2007. The Municipality lies within Longitudes 0.30E and 1.05W and Latitudes 5.45N and 6.005S. It is located east of the Volta estuary, about 160km to the east of Accra, off the Accra-Aflao main road.

Out of the total surface area of 1,086km<sup>2</sup>, approximately 362km<sup>2</sup> (about 30 per cent) is covered by water bodies. The largest of these is Keta Lagoon, which is about 12 km at its widest section and 32km long.



Figure 1. Study Area

### Background to the Problem of the Study

- The municipal Assembly is responsible for the planning, management and coordination within its jurisdiction (Local Gov't - Act 462)
- A coastal municipal with about 50 small communities
- It is a low-lying area with the highest point being 53m above sea level and the lowest ranging between 1m – 3.5m below sea level
- Some major economic activities include fishing, salt/sand mining, trading

- Six out of 10 highly populated areas are along the coastal strip
- Limited land for expansion within the coast
- It is the number one of the 25 coastal erosion hot-spots in Ghana (identified by Nail et al. (1993))
- Major problem is erosion from the sea

### **Reasons for Severe Erosion**

- Wave occurrence and tides
- Construction of Ghana's Akosombo Dam
- Sea Level Rise
- Sand Mining and Mangrove Harvesting
- Geomorphological Characteristics

### **Interventions**

- Resettlement programme undertaken as part of Sea Defence Wall Construction
- Flood Control Gates
- Adhoc measures

### **Objectives**

- Assess the erosion and shoreline changes over the years with emphasis on consistent changes
- To assess the contribution of the erosion on housing distribution, required and quality of housing
- Establish a pattern for housing and settlement change to identify options for mitigations and adaption
- to identify factors that contribute to exposing the community/housing to the risk of erosion to housing deterioration and total housing loss

### **Research Questions**

- What has been the situation of erosion in the municipal
- Is the settlement growth reflective of the erosion patterns?
- What factors contribute to this problem and their effects

### **Motivational Context in Japan**

- To adopt practical implementable strategies in Coastal/DRR Management
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## **Itinerary and Progress**

The fieldwork itinerary started by travelling through Haneda airport (Japan) with a transit in Paris Charles De Gaulle airport in France before arriving in Accra - Ghana on August 31. Since September 1, was public holiday in Ghana, the first set of data collection started from Monday September 4 to Friday September 8.

### *National Level Data Collection*

During this period, the set agenda was to visit the relevant national institutions involved in my research. The initial plan for the National institutions was to solicit information within one day. However, due to the difficulty in arranging meetings at this level, a total of five days was used for this purpose. Institutions visited within this period include The Ghana survey department, Environmental Protection Agency (EPA), hydrological Service Department, Town and Country Planning Department (National), Land valuation Board and the National Development Planning Commission (NDPC). Relevant sets of information such as national plans, programs and plans were gathered from some of these institutions.

### *Municipal Level Data Collection*

The first day of this period was used as a familiarization visit to the Municipal Assembly (the authority responsible for the management of the municipality) where I visited many offices including; the Municipal Physical Planning Department, the Municipal Development Planning Department, the Municipal NADMO office and the Budget/Finance office. In all, since there was no prior reservation of meeting appointments, I could not receive any data on this day although I could introduce my mission in the municipal.

*Pretesting of questionnaire:* As a result of my inability to conduct meetings at the municipal offices due to prior arrangements, the rest of the day was used as a pre-test to my questionnaires for the household/tenants. The pre-testing was only conduct in the Keta community and a total of ten questionnaire were administered during this period. This result of the pre-testing suggested an adjustment of the questionnaires for household or tenants. The average income originally was in the ranged from approx. \$2.00 - \$5.00 but was however readjusted to \$2.00 - \$10.00.

The second day of this period started visit a visit again to the Municipal Offices where some needed information was gathered from various offices and personnel although not every information could be gained.

The Municipal Planning office was where most information was gathered and it included the Municipal Medium-Term Development Plan (MTDP 2014 – 2017) and a draft Medium-Term Development Plan (MTDP 2017 – 2020). Amongst the information in this plan was the growth perspectives and goals for the municipal between the period 2017 – 2020.

There were insufficient data from the municipal which stem from many factors such as poor records keeping, unavailability of relevant officers, unavailability of the data itself and many others.

#### *Local Level Data Collection*

The rest of the day; through to the last day of this period was used to administer questionnaires to households, tenants and house owners and community leaders of my first study community. Before choosing which communities to visit for the questionnaire administration, a shoreline change analysis was conducted using Landsat image analysis with GIS to understand which areas continuously experience erosion. It came out that, the northern-eastern section of the municipal (along the coast) was where there was extreme erosion. Therefore, the section was selected for the questionnaire administration to understand from the residents, how they are coping and what factors are contributing to the erosion. As a result, a total of four communities fell under the extreme erosion areas.

A total of 20 questionnaires were administered within the first community which is Keta Township; together with one questionnaire for their community leader. The housing assessment was done through a self-designed criterion. The assumption for these criteria was that, since most houses in the community are made up of usually four-sided walls or facades. Therefore, one cracked wall represents a fair classification, two-side is bad and three; worse. The same scenario applied to the roofs where one side roof with holes or ripped off considered “fair” and the rest categorized as bad or worse.



Figure 2: Questionnaire administration with assistant

Figure 2 shows how the questionnaires were administered together with a respondent and a gate keeper who translated the questions to the local language Ewe. Figures below represent some of the pictures taken as part of the housing assessment.



Figure 3 Good Housing typology



Figure 4: Worse housing typology

Second community: Adzido; is the second community within the municipal identified as part of the area of interest for my research. Twenty questionnaires were administered within this community and one town leader was also interviewed.

Third and fourth community questionnaire administration: In all, forty questionnaires were administered each to these communities together with two community leader interview.

This meant that, all the four communities had been covered for the period and a biased level was reduced because these communities are local fishing towns and most respondents are in their houses working on their sea products or at the beach close to their house throughout the day.

In all, a total of eighty (80) questionnaires were administered within four coastal communities in the Municipal. Since I do not speak the language of the local people, a local translator was solicited to assist the questionnaires administration at a honorarium of 1050yen per hour.

### **Preliminary Analysis**

Upon return from the fieldwork, sorting, collation and analysis have been carried out to aid the understanding of the problem and possible solution. The figures below show some of the analysis done so far from the fieldwork.



## Housing Distribution

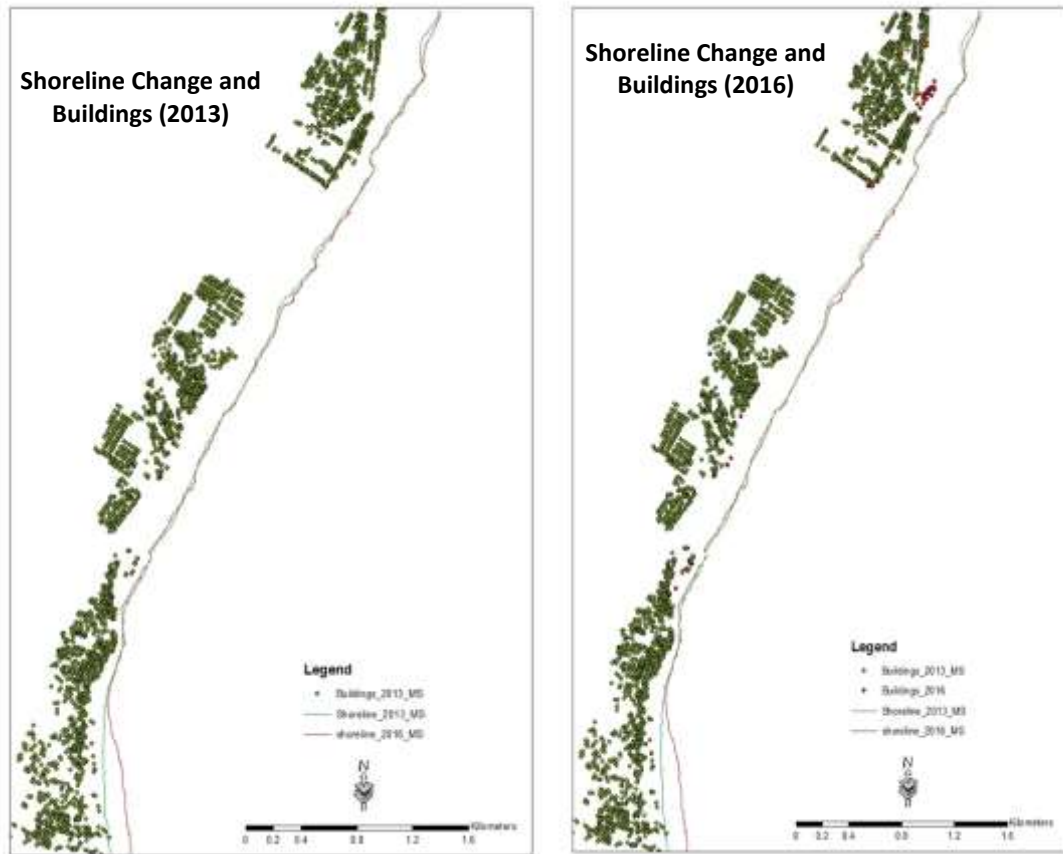


Figure 5: Housing Distribution in the Study Area

The data showed how the houses in the area are distributed along the sea. Looking at the 2013 map and the 2016 maps, it can be seen that most of the buildings (shown in red) are occurring in the eastern part of the settlement and also getting closer to the sea. However, figure 7 below show areas of shoreline erosion and accretion. Looking at the map on figure 6, it is obvious that the distribution of the houses does not follow whether there is erosion in the area or not. The red shoreline indicates areas of erosion and the pink shoreline indicate areas of accretion or land gain.

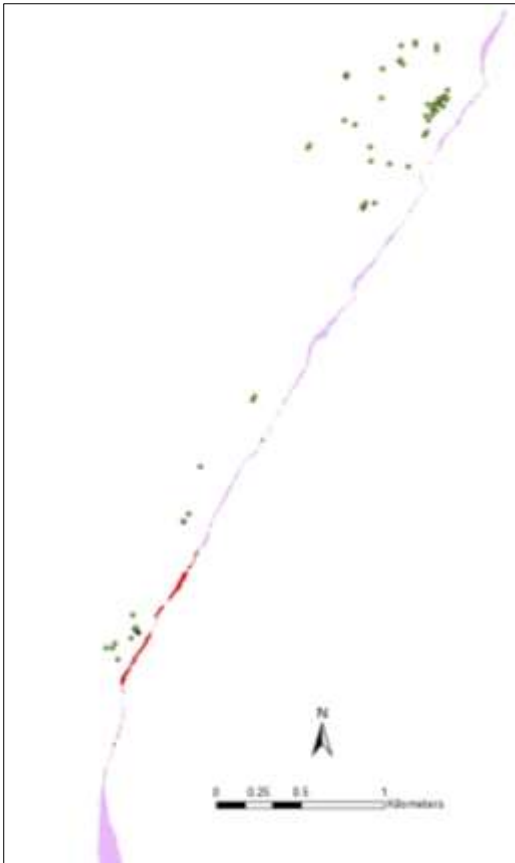


Figure 6: Shoreline Erosion and Housing Distribution

*Observation:*

- New development occurred in mostly indigenous areas where land belong to families (reclaimed land belongs to government)
- Growth in southern part was hindered by the defence wall and water barriers.
- Lateral spatial expansion is restricted by existing gryones, implying the reason for growth towards sea
- Some new buildings are in the areas of land loss to erosion

*Implication*

- Settlement growth can be restricted by barriers
- Unapproved/unauthorized land prevents development

### Housing Distribution Pattern

It was realized that houses in the community were developing near the sea and from the data collected from respondents, it showed many reasons for this phenomenon. Examples of these reasons are; although each respondent have experienced erosion by the sea before, they are not willing to move away from their current location (which is near the sea) although there was the understanding of relocating if possible. A further probe revealed these respondents' have their livelihood and therefore wouldn't want to move far away from the sea.

### Housing Condition

Housing condition was one of the main focus of the fieldwork. That is; to know the condition of housing by the erosion from the sea. The figure bellow show how analysis depicted the condition.

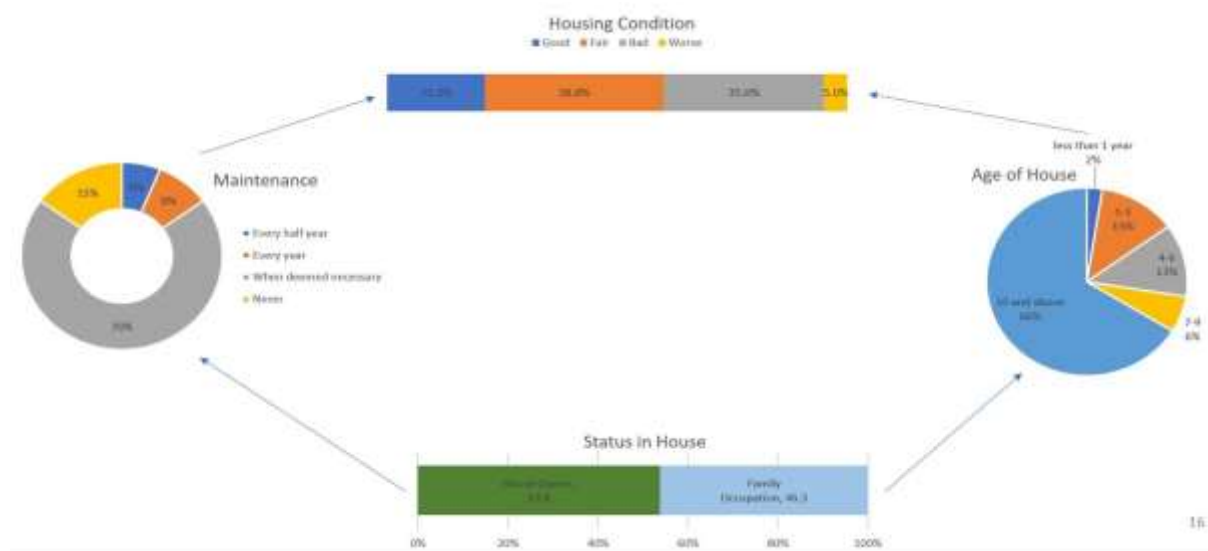


Figure 7: Housing Condition

The analysis shows contrary to the initial perception that, sea erosion was entirely responsibly for the deplorable housing condition in the coastal community. It revealed that, bad maintenance culture, coupled with old housing also contribute to the poor housing quality in the area even though erosion is also a contributing factor to the deplorable condition.

### Conclusion

1. Although there were challenges in the data collection especially during questionnaire administration, available data and progress is on track and hope that with the available data and logistics available, the research can be completed on time.

## Appendix

### Sample of Questionnaires

#### **Keio University SFC, Japan**

Graduate School of Media and Governance

Master Thesis Questionnaire

Research Title: *Impacts of Coastal Erosion on Housing Infrastructure and Distribution in Keta Municipal of Ghana.*

Information gathered from this questionnaire is for academic research purposes only.

E

#### **Community Leader**

Name of community:.....

1. What is your status in this community?  
Specify.....
2. How long have you lived in this community (in years).....
3. What is the average rent in this community?  
.....
4. Can you give account of the average rent over the years?
  - a. 2016 – 2017 .....
  - b. 2014 – 2015 .....
  - c. 2012 – 2013 .....
  - d. 2010 – 2011 .....
  - e. 2010 and before .....
5. What account for the variations?  
.....  
.....  
.....  
.....  
.....
6. Can you give account of the average land over the years?
  - a. 2016 – 2017 .....
  - b. 2014 – 2015 .....
  - c. 2012 – 2013 .....
  - d. 2010 – 2011 .....
  - e. 2010 and before .....
7. What account for the variations?  
.....  
.....  
.....  
.....
8. Has this community experience any effects of sea erosion?
  - a. Yes
  - b. No
9. If yes, how did it affect the community  
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- .....  
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10. What measures have been put in place by the community to reduce the erosion?  
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11. What can be done to reduce the impacts of the erosion?  
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12. What can the community contribute to the solution suggested above?  
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**Keio University SFC, Japan**

Graduate School of Media and Governance

Master Thesis Questionnaire

Research Title: *Impacts of Coastal Erosion on Housing Infrastructure and Distribution in Keta Municipal of Ghana.*

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**Household Questionnaire**

Name of community:.....

1. Gender

- a. Male       b. Female

2. Occupation

- a. Fishing       b. Crop farming       c. Artisan       d. Formal   
e. Other (specify).....

3. Do you have any other job?

- a. Yes       b. No

3b. If yes, specify (type).....

4. Average Monthly Income (in GHC)

- a. 20 – 49       b. 50 – 79       c. 80 – 109       d. 110 – 139   
e. 140 and above

5. How long have you lived in this house (in years)?

- a. less than 1       b. 1 – 3       c. 4 – 6       d. 7 – 9   
e. 10 and above

6. How old is this house (in years)

- a. less than 1       b. 1 – 3       c. 4 – 6       d. 7 – 9   
e. 10 and above

7. Status of house

- a. Tenant       b. House Owner       c. Family Occupation

8. How much is the rent in this house (in GHC)?

- a. 10 – 29       b. 30 – 49       c. 50 – 69       d. 70 – 89   
e. 90 and above

9. How often if maintenance done on this house

- a. Every half year       b. Every one year       c. Every two years   
d. When necessary       e. Never

10. Reasons for maintenance

(specify).....  
.....  
.....  
.....

11. Average cost of maintenance:.....

12. How many rooms are in this house?

- a. 2 – 4       b. 5 – 7       c. 8 – 10       d. 11 - 13   
e. 14 and above

13. How many rooms are inhabitable?

(Specify).....

14. What reasons account for the inhabitable

rooms.....

15. Have you have experience of sea erosion in this community?

- a. Yes       b. No

15b. If yes, how did it affect your household,  
community:.....

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15c. How did you deal with your/community's encounter with the erosion

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16. Are you willing to increase your expenditure on the following for better improvement?

16a. Expenditure on Rent a. Yes b. No

16b. Expenditure on Repairs/Maintenance a. Yes  b. No

17. Are you willing to relocate in case the need arises?

a. Yes  b. No

18. Give reasons for your answer in question

17.....  
.....  
.....