Far Dwuma Nkɔdo

Securing Sustainable Fisheries

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Landing Site Mapping Using GeoODK Application

Training Manual for Community Mobilizers

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Cover Photo: Field Demonstration meeting at Egya and Project Officer undertaking landing site mapping at Duakor, Cape Coast (Credit: Hen Mpoano)

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1. Background Information

This training manual was designed to aid a selected group of community mobilizers to understand the concept of mobile mapping and to introduce them to the practical use and application of the software application under Activity 2.22 of the Far Dwuma Nkodu project. As part of the projects first-year activity, the Fish Landing Site Mapping was conducted across the coastline of the Central Region and two other selected landing sites in the Ada East Metropolis. The key goal of Activity 2.22 is to identify and map the boundaries of the various landing sites and document land uses that conflicts with the primary use of the beach as a landing site. To productively use this training manual, it is suggested that the user uses it in connection with mobile devices with the GeoODK Mobile software application duly installed.

2. Training Manual Objectives

This training manual serves as an introduction to the use of the GeoODK program for mapping the boundaries of fish landing site. This manual seeks to explore the key functionality of the mobile software application and should be not be considered as a fully exhaustive or conclusive manual in itself. Thus, not all aspects of the program's operation are covered in this training manual. Additionally, the key objective was to introduce the tool to community mobilizers to aid them in mapping the boundaries of the fish landing site within the project area. Users can work through this manual at your own pace by following the steps and examples used to point out the operation of various program aspects for mapping equally similar boundaries as used in this manual. Prior to exploring its abilities, it is important to have the program installed and available while working through this manual. After it installation, the program could be run without connection to the internet.

3. Program Purpose

GeoODK[1], developed over Open Data Kit (ODK) which handles form data collection but lacks spatial mapping component, is an open source platform for collecting, storing, editing and visualizing geo-referenced information, along with a suite of tools to visualize, analyze and manipulate ground data for specific needs. The tool, developed and funded by the University of Maryland Department of Geographical Sciences and the International Institute for Applied Systems Analysis (IIASA) replaces

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[1] Visit www.geoodk.com for a complete record of the program and it developers.

the paper based mapping approach by utilizing hardware capabilities of the phone to automate and centralize geolocation data.

It enables an understanding of the data for decision-making, research, business, disaster management, agriculture and more. As a multi-dimensional application, GeoODK seeks to provide an open source platform capable of handling spatial data collection. Characteristically, GeoODK provides opportunities for offline mapping, visualization of collected data on mobile devices, and eventual access to the collected points for further development in other geospatial desktop application platforms like QGIS[2].

4. Requirements

In order to use the GeoODK program, the user will need the following hardware and software items. Hardware wise, the user will need any modern android mobile phone or tablets with good locational features. Software wise, a hardware phone or tablet running Android software versions 4.4 or recent is highly preferred. Additionally, users could download and install the GeoODK application from the google play store (see Table 1 below for some recommended hardware and software features). There are no special dependencies for installing and running the application. Depending on the nature and level of detail expected, it might be necessary to have a backup storage support like a microsd card to store aerial photographs or provide space support to host images downloaded as evidence of event or objects captured as part of the mapping activity.

Table 1: Hardware and Software specification for consideration before mapping.

Hardware Specification	Software Specification	
*Android Mobile phones model years 2013 and beyond (LG, Infinix, Motorola, Sony, Samsung etc.). *Android Tablets model years 2014 and current (preferably Samsung Galaxy Tab A).	KitKat	4.4 – 4.4.4
	Lollipop	5.0 – 5.1.1
	Marshmallow	6.0 – 6.0.1
	Nougat	7.0 – 7.1.2
	GeoODK Collect	

5. Data Collection Using The Modified GeoODK Collect

Ahead of mapping with this tool, three key processes ought to be followed (see Figure 1, 2, & 3). First is the installation of the tool itself, the second is the development, configuration and integration of the

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[2] QGIS ,also known as Quantum GIS is one of the widely used open source geographic information system application software for geospatial analysis, data visualization and map making. See www.qgis.org/

form in the mobile device before mapping, while the third focuses on downloading the form and beginning the mapping task proper. This training manual however skips the first two steps but focuses on the third.

1 This step involves downloading and installing the GeoODK application on the mobile device of choice. Usually, the default options for the installation if preferred. The use of mobile data is advised if Wifi services are unavailable at the time of downloading the application.

GeoODK App Icon

This step involves the creation of the online form to aid the collection of attribute information accompanying the mapping activity itself.

Developing a form demands critical thoughts on the content of the form and additional relevant to capture the state of the art or issues under investigation.

type	name	label::en	hint	required
date	date_of_mapping	Date for mapping date		
start	start			
end	end			
today	mapping_today			
deviceid	IMEI			
begin group	location_attributes	Location Attributes		
select_one district	landing_site_district	District of landing site		yes
select_one sitename	landing_site_name	Name of landing site		yes
integer	landing_site_id	Provide a unique ID for landing site		yes
integer	number_registered_boats	How many boats are registered in this LS		yes
text	list_competing_use	Provide a list of competing land uses in this LS		yes
select_one yes_no	competing_LUT	Do the available LUT compete for space in this LS?		yes
text	dominant_species	Please provide one dominant species that apply to this LS		yes

2

Development of forms
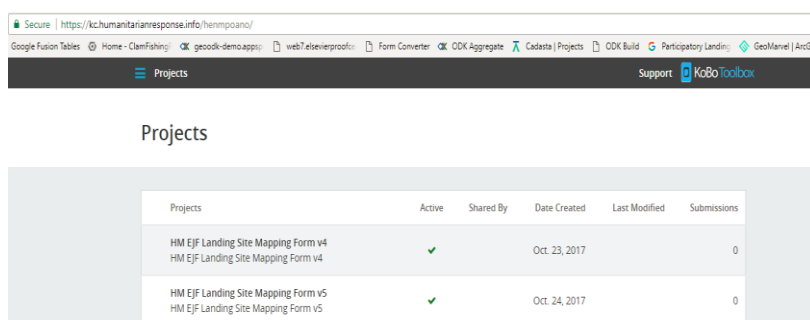
Deployment of forms from server

3 Once step 1 and 2 are completed, the follow-up step is to download the form unto the mobile device and set it up for the main mapping activity.

This requires internet connectivity to aid the deployment of the form from the server (see Fig. 5).

The following procedures, guided by screenshots of descriptive text from the GeoODK platform itself systematically takes the user through different steps we employed to modify the tools functionality for the Far Dwuma Nkodo Project.
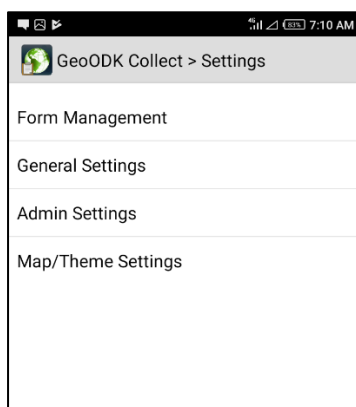
6. Setup

6.1. GeoODK Setup

Figure 4
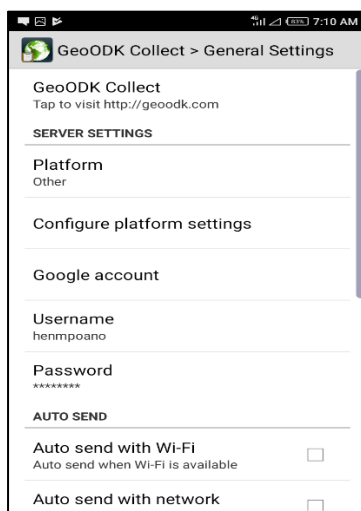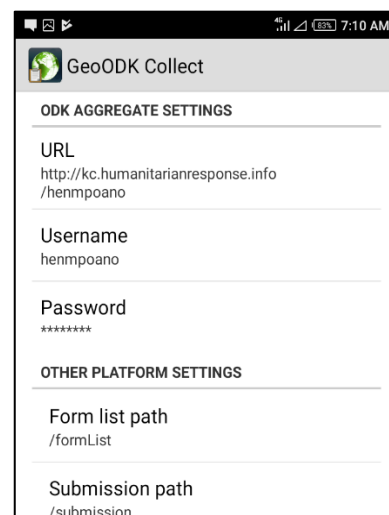
On the main page, six icons are displayed.

Collect data leads you to the downloaded survery forms to fill.

Edit data enables editing of completed forms.

Delete data allows deletion of completed and blank forms.

Send Data allows user to send filled forms to the server.

Map Data allows the user to visualize collected geo-spatial data on a map.

Figure 5

To set up the app for data collection, the server and login details have to setup.

Tap **Settings** from the main page, select **General Settings, and** complete the setup as follows;

Platform: other

Configure platform settings:

      url: kc.humanitarianresponse.info/henmpoano

      User: henmpoano

      Password: henmpoano2017

Figure 6

Figure 7

6.2. Downloading Survey Forms from Server
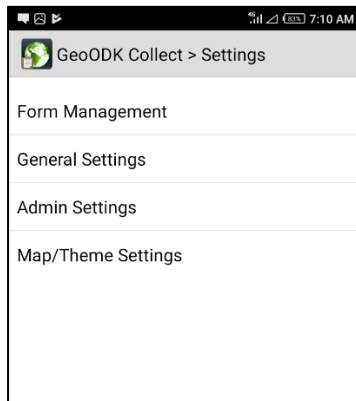
Figure 8

On the **Settings** (Fig. 8) page, Select **Form management,** allow app to get form list from the server and then check only the **HM EJF Landing Site Mapping Form v5** as shown in Figure 9.

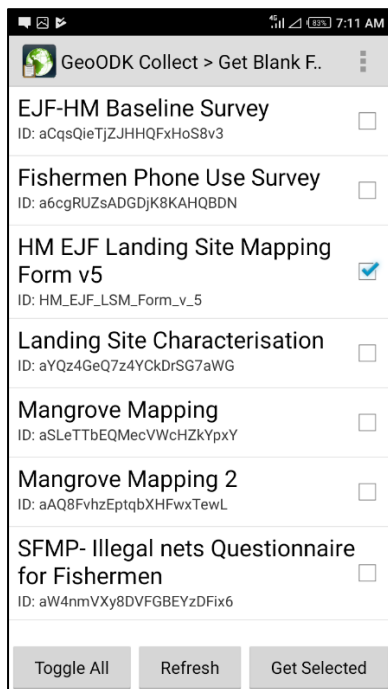Tap **Get Selected** to download the form

Figure 9

A **Download Result (Fig. 10)** tab would pop up indicating whether form download was successful or not.
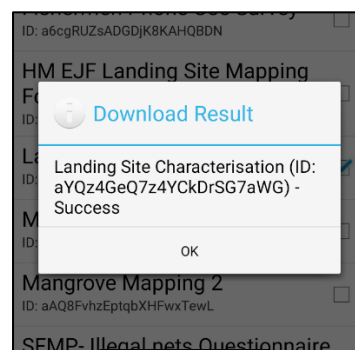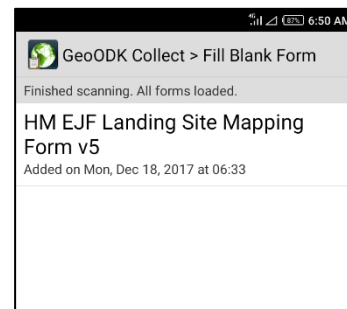

Figure 10

6.3. Filling The Survey Form

Figure 11

Figure 12

Go back to the main page, tap **Collect Data** and select the form which was downloaded(Fig. 12) in the previous step.

The form is navigated by **swiping right** to the **next question** or **swiping left** to the **previous question** (Fig. 13).

Fill the information as required.

NB>The form will not move to the next question until the question has been answered

Special definitions

LUT: land use type (LUT) is what the land is being used for.

Competing Land Use: any activity or land use that interferes or could potentially interfere with the use of the beach as a landing site for fishing and fish related activities. Examples could be drinking bars, residential apartments, hotels, beach resorts etc.
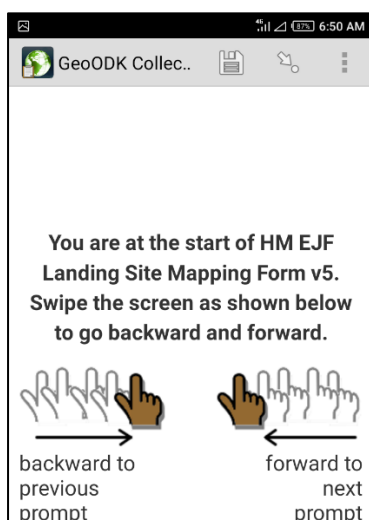

Figure 13

6.4. Mapping Component

The GPS mapping component of the GeoODK allows a user to either record a point, select a point on a map, draw coordinates on the map or walk the boundaries of objects or areas in geographic space. Two approaches were followed for the purpose of the landing site mapping (see Table 2).

Table 2: Approaches adopted for mapping fish landing sites.

What to map?	GeoODK option
Map boundaries of landing site	Walk the boundaries
Map competing land use	Record GPS point

A full disclosure of these key approaches are presented below.
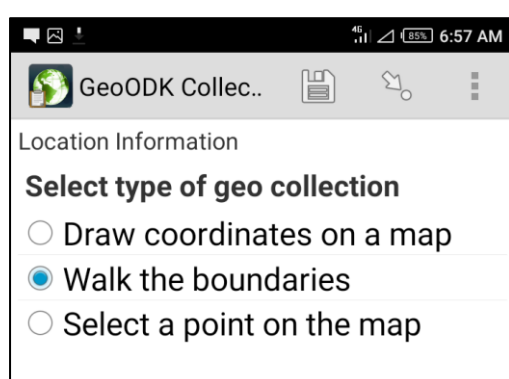
6.4.1. Mapping boundaries of landing site

Figure 14

Select **Walk the boundaries** (Fig. 14).

Tap on the **Record GeoTrace** (Fig. 15) button.

If the phone's GPS is turned off, the app would notify you to enable the phones GPS (Fig. 16).

After getting access the phone's GPS, allow the app to connect aquire GPS signal (about 30 seconds) then tap the **red play-like button** (Fig. 17) at the top left part of the screen.

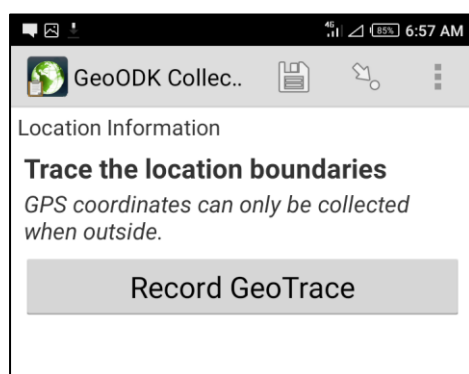In the Geo-trace Instruction pop up (Fig. 18), select **automatic mode** and select **5** and **Seconds** in the next pop up (Fig. 19).
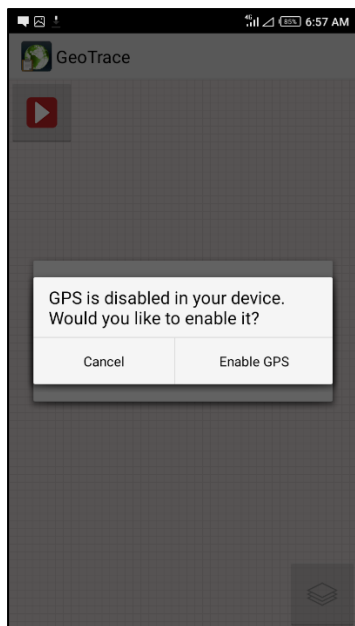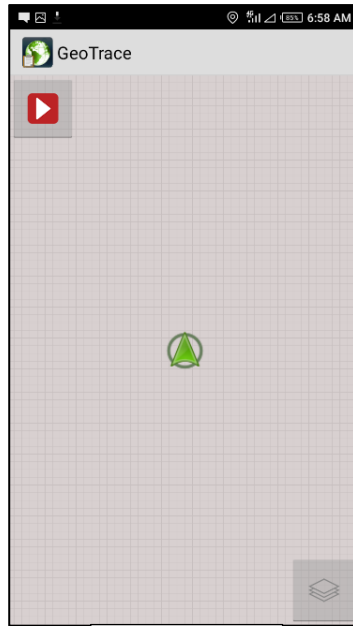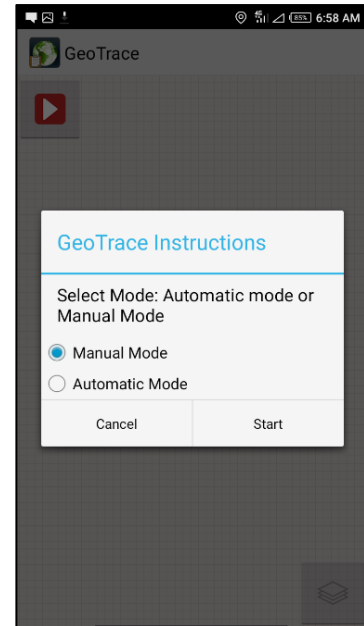

Figure 15

Figure 16
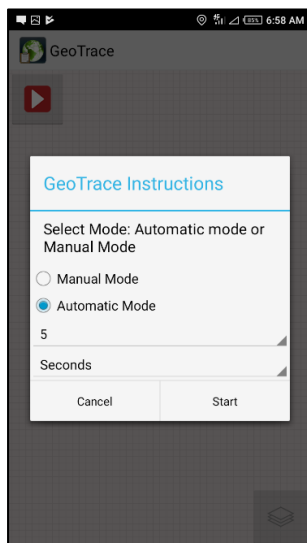

Figure 17

Figure 18

Figure 19

Select **Walk the boundaries** (Fig. 14).

Tap on the **Record GeoTrace** (Fig. 15) button.

If the phone's GPS is turned off, the app would notify you to enable the phones GPS (Fig. 16).

After getting access to the phone's GPS, allow the app to connect aquire GPS signal (about 30 seconds waiting time) then tap the **red play-like button** (Fig. 17) at the top left part of the screen.

In the Geo-trace Instruction pop up (Fig. 18), select **automatic mode** and select **5** and **Seconds** in the next pop up (Fig. 19). This allow the tool to drop a coordinate every **5 secs**.

Wait for the first point to be indicated, then walk around the landing site. Keep the phone screen on to avoid errors during recording.
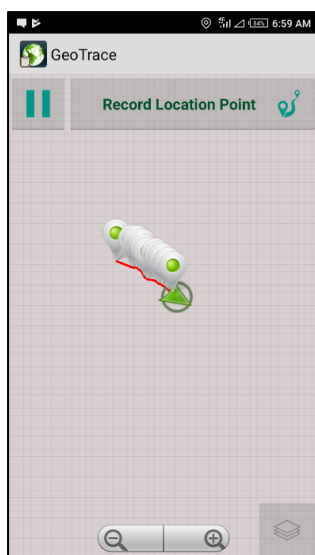
Figure 20

The pause button that replaces the play-like button at the upper left screen (Fig. 20) can be used to pause recording if there is the need to avoid and obstacle that could affect the output.

After walking around the boundaries, stop recording by taping the Pause button, the tap the Save (diskette-like icon).

In the select polygon/polyline pop-up that appears next, select Save as polygon to finish at Fig. 23.
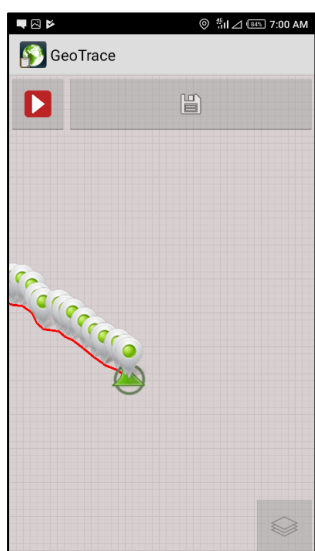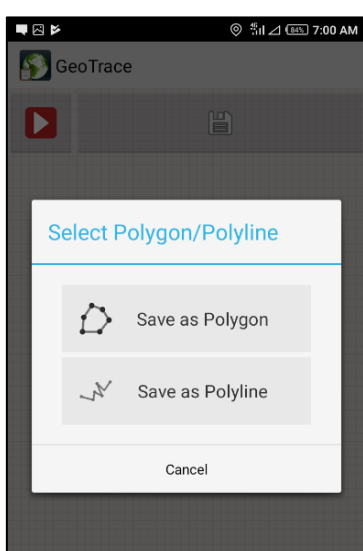
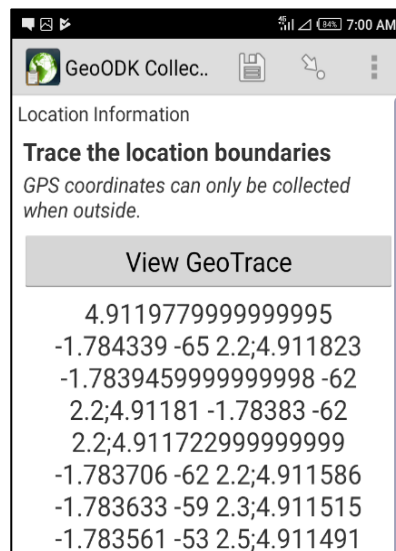Swipe right to the next screen.

Figure 21

Figure 22

Figure 23

6.4.2. Competing Land Use

As decribed earlier, competing land uses and uses that tend to interfere with fishing and fish processing activities at the landing site.
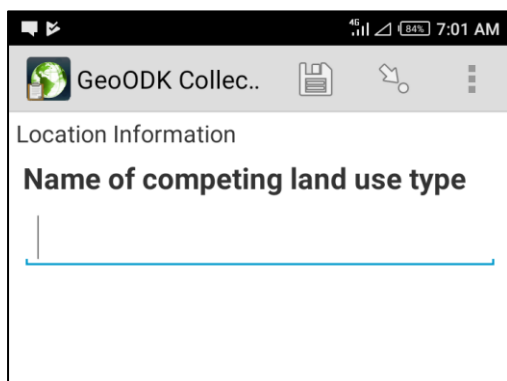

Figure 24

In the next screen (Fig. 24), give a list of all probable competing land ues given by the community assistant.

Tap Picture in the Photo of landmark section (Fig. 25) to take a picture of the landing site that tries to give a wholistic view of the activities taking place at the landing site.
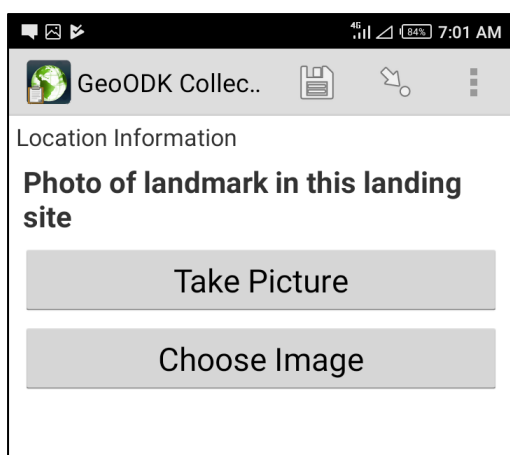
11

Figure 25

Tap Picture in the Photo of landmark section (Fig. 25) to take a picture of the landing site that tries to give a wholistice view of the activities taking place at the landing site.

It launches the native camera app on the phone. Based on the phone's secifiction take a clear picture. Tap the 'x' (or 'cancel' depending on the phone) button to discard photo if it was not taken well otherwise tape the ok or correct button to proceed(Fig. 26).

After swiping right to go to the next screen, tap **Add group** (Fig. 27) to start recording individual competing land uses.
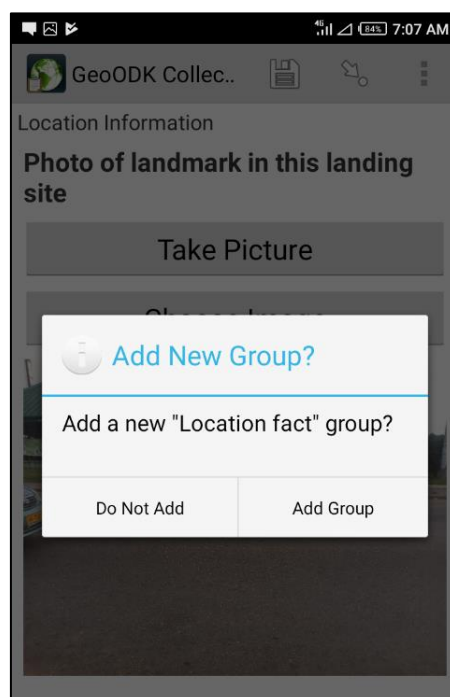

Figure 26

Figure 27

6.4.3. Recording Individual Competing Land Uses

As discussed earlier, individual competing land uses would be recorded using the Record Location feature.
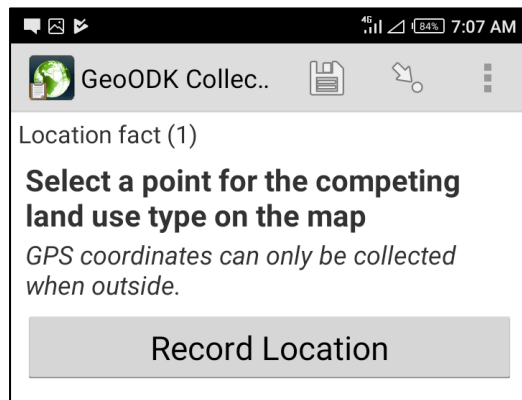

Figure 28

After taping **Add group** (Fig. 27), tap **Record Location** button (Fig. 28).

Wait for the recording location pop up dialogue box to disappear, tap the blue button at the top left corner of the screen and then tap the save button at the top right corner to reach Fig. 30.

Swipe left and input the name of the competing land use (Fig. 31).

After completing the entry, swipe left and chose **Add group** to repeat the steps for another competing use or tap **Do not Add** (Fig. 32) to complete entry.

Swipe to the final screen and name the form.

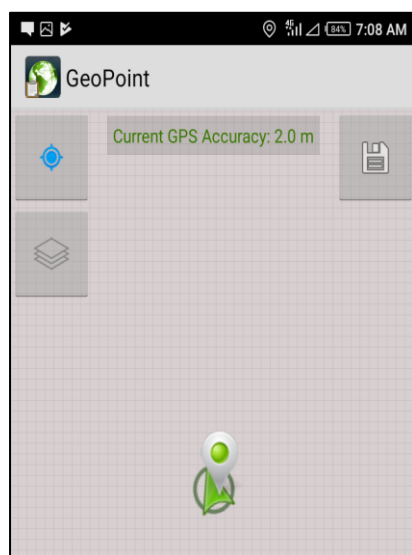Mark as finalized and tap save Form and Exit button to finish entry for the landing site (Fig. 33).
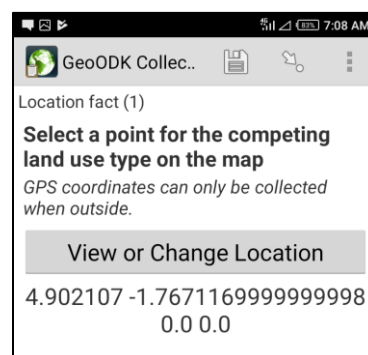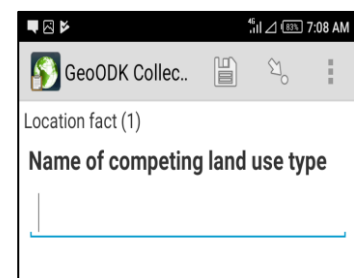

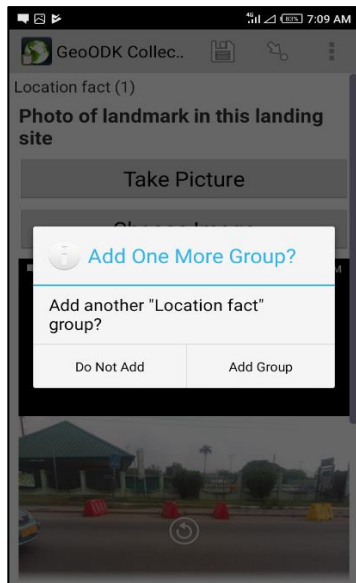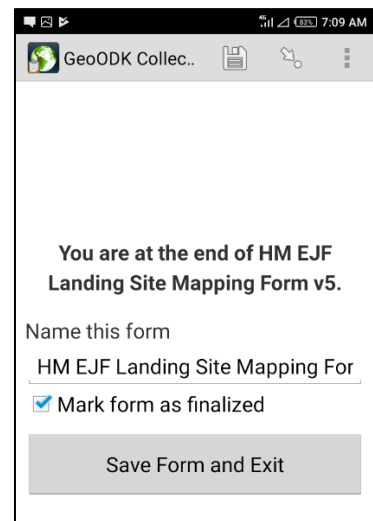Figure 29

Figure 30

Figure 31

Figure 32

Figure 33

6.5. Editing and Submitting Saved Forms

It may become necessary to edit saved entries before submitting to the online server. It is important to name forms in an easily identifiable way.

Figure 34

Editing Saved Forms

- On the main page, Select Edit data.
- Select the form.
- Navigate to section that requires editing.
- Swipe till the last page of the form and Save.

Submitting Saved Forms

- On the main Page (Fig. 34), select Send Data.
- Check all the forms to be submitted and tap selected.
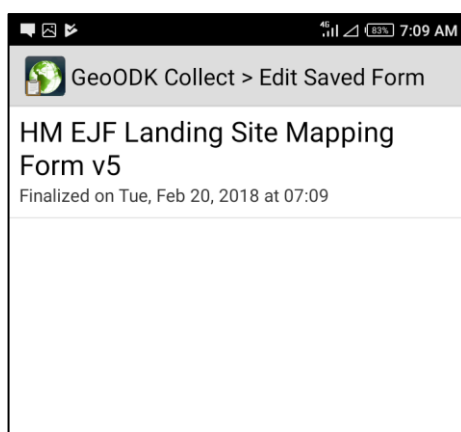- A pop up will show progress and completion of process.

14

Figure 35

Figure 36

Figure 37

7. Status of Work Done

The main mapping activity was carried out in multiple phases. The first phase was conducted in the KEEA, Cape Coast and AAK districts between October, 31st and November, 3rd 2017. The second phase of the mapping was conducted in the Effutu Municipality from 7th to 9th November, 2017. The last phase of the mapping was conducted in the Ekumfi District from 20th to 24th November, 2017.

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[3] All images used in this descriptive text were obtained from the official GeoODK software window. The modification of the tool aided our practical implementation of the tool for our project.

Table 3: Work Progress on Landing Site Mapping Activity

| PHASE	DATE	DISTRICT	STATUS
1	31st October to 3rd November, 2017	i. Komenda, Edina, Eguafo, Abrem (KEEA) Municipal ii. Cape Coast Metropolitan iii. Abura/Asebu/Kwamankese	Completed
2	7th to 9th November, 2017	Effutu Municipal	Completed
3	20th to 24th November, 2017	Ekumfi	Completed
4	18th to 20th December, 2017	i. Gomoa West ii. Awutu Senya	Completed
5	29th to 31st December 2017	Gomoa East	Completed
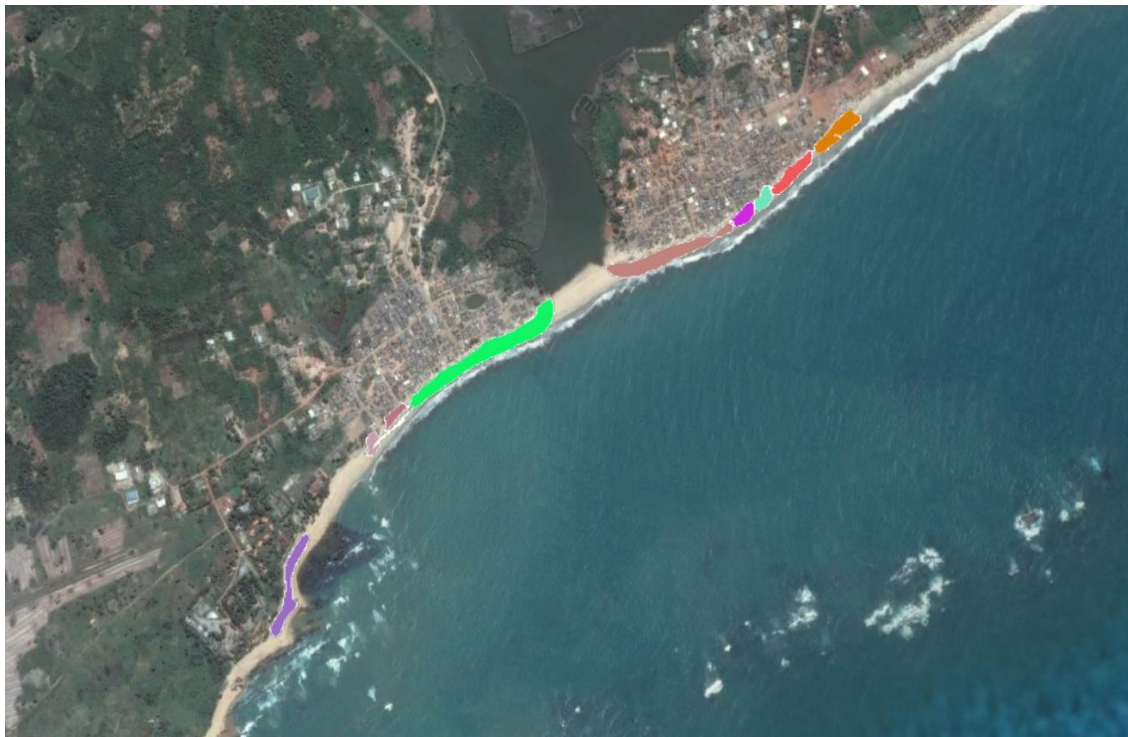
Figure 38: A classic example of work output exported as *.kml format for visualization in GoogleEarth Pro. Mapped landing site boundaries are represented with different colour shades.

8. Conclusion

This concludes this GeoODK fish landing site mapping training manual. If the user worked his or way through all relevant topics presented in this manual, you have indeed witnessed one of the few largescale application of the GeoODK mobile mapping approach in sub-saharan Africa. The idea was not to test the capabilities of the tool, but the applicability of the tool for a large scale mapping activity as this. For further information about the technical details adapted to this approach to facilitate our work, the user is welcomed to seek for additional support from the GIS specialist for the Far Dwuma Nkodu Project. For specific assistance on GeoODK itself, users are invited to visit the Help Menu of the application, or visit the main page of the tool (see http://geoodk.com/index.html). All comments on this training manual could be submitted to gishm2017@gmail.com, justinkoom@yahoo.com, or sbogobley@henmpoano.org for responses and further assistance.